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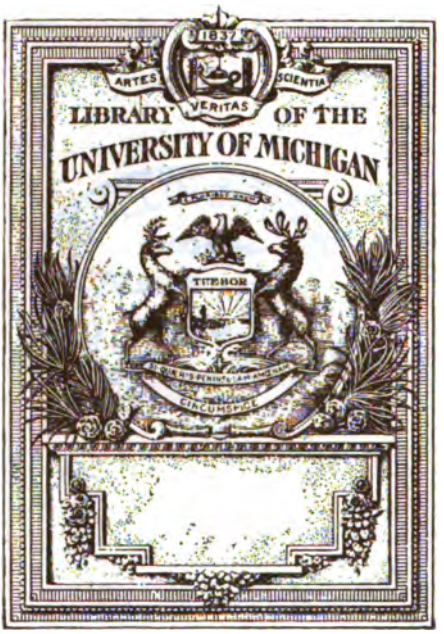

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ASTRON OBS.
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1846
1846-1848
JAN. Jul

Sir J. F. W. Herschel Bart.

from the Observatory

Dunkirk.

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RESULTS

OF

ASTRONOMICAL OBSERVATIONS,

MADE AT

THE OBSERVATORY OF THE UNIVERSITY,

DURHAM,

FROM JANUARY, 1846, TO JULY, 1848,

UNDER THE DIRECTION OF

THE REV. TEMPLE CHEVALLIER, B.D., F.R.Ast.S.,

PROFESSOR OF MATHEMATICS AND ASTRONOMY IN THE UNIVERSITY OF DURHAM.

BY

THE REV. ROBERT ANCHOR THOMPSON B.A.,

OBSERVER IN THE UNIVERSITY.

DURHAM:
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1849.

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INTRODUCTION.

THE Observatory of the University of Durham was built in 1841, principally by private subscription. The Observations, under the general superintendence of the Professor of Mathematics and Astronomy, are conducted by an Observer, resident at the Observatory. The following pages contain the results of Observations made between January, 1846, and July, 1848.

I. *Latitude and Longitude of the Observatory.*

The latitude was determined in the year 1843 from a large number of direct and reflected Observations of α, δ and λ Ursæ Minoris, and found to be 54°. 46′. 6″·2.

The longitude of the Observatory has hitherto been taken as 6m. 18s. West.

This value was obtained by assuming the longitude of Durham Cathedral, as given in a general survey, to be 6m. 16s., and measuring trigonometrically the difference of longitude of the Observatory and the Cathedral. That difference is + 2·36s. in time, and the resulting longitude of the Observatory, 6m. 18·36s.; the nearest whole number of seconds, 6m. 18s., was taken.

In order to correct this approximate value of the longitude, the meridian observations of the moon made on the same nights at Durham and at Greenwich have been compared, and the longitude deduced from them in the following manner.

A clock error has been found, by means of the Moon-Culminating Stars, and other stars lying near the Moon's parallel. The assumed places of the stars are those deduced from the whole of the Observations made at Greenwich during each year. When any star has been so observed less than three times, its Right Ascension has, in general, been brought up from the Greenwich Catalogue of 1439 stars. The places of stars contained in the Nautical Almanac have been taken as assumed at Greenwich. The Right Ascensions of the Moon's Limbs at the Greenwich Transits are those given by the Greenwich Observations, independently of the Moon-Culminating Stars. The motion of the Moon in one hour of longitude has been interpolated from the Nautical Almanac; the longitude of Durham is then found by a simple proportion.

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The Durham Observations up to the end of 1845 were made by the late Observer, Mr. Beanlands, those in 1846 by myself.

The results are as follows:—

DIFFERENCE OF LONGITUDE OF GREENWICH AND DURHAM.

Date.	No. of Stars.	Longitude.	Date.	No. of Stars.	Longitude.	Date.	No. of Stars.	Longitude.
		m. s.			m. s.			m. s.
1842			1844			1845		
Aug. 17	3	6 10·1	Aug. 29	3	*6 16·6	Dec. 12	3	6 18·3
Sept. 14	5	6 18·9	Sept. 24	2	6 13·1	— 13	3	*6 12·7
Oct. 19	4	*6 22·1	Oct. 22	3	6 14·3	1846		
1843			Nov. 20	2	6 29·5	Feb. 4	3	6 19·6
Jan. 10	2	6 11·1	— 21	3	6 16·3	— 6	3	6 17·5
April 10	3	6 15·6	1845			— 7	4	6 21·8
— 11	2	6 16·5	Jan. 21	2	6 17·9	— 10	4	6 10·1
Aug. 4	1	6 17·1	Feb. 14	1	6 21·8	Mar. 4	4	6 22·5
Sept. 5	1	6 18·0	— 17	2	6 21·2	— 5	5	6 18·4
Oct. 4	2	6 8·3	Mar. 20	4	6 22·2	— 7	4	6 17·0
1844			April 16	2	6 24·8	— 11	3	6 22·3
Jan. 1	3	6 17·9	— 19	2	6 21·1	— 12	7	6 20·4
— 2	2	6 20·3	— 22	1	*6 27·7	— 12	7	*6 22·8
Feb. 1	2	6 23·4	June 19	1	6 24·7	May 11	2	*6 29·5
Mar. 29	3	6 15·7	— 19	1	*6 21·9	June 3	2	6 20·6
— 30	3	6 19·2	Sept. 12	1	6 18·4	— 5	1	6 15·6
April 1	3	6 19·6	Oct. 10	1	6 15·5	— 6	4	6 14·2
—— 27	3	6 20·6	— 11	3	6 21·1	Oct. 3	3	6 14·2
—— 29	3	6 16·5	Nov. 12	3	6 26·4	Dec. 29	1	6 21·1
Aug. 28	3	*6 22·9	Dec. 9	2	6 21·5			

* Observations of the Moon's 2nd Limb.

The mean of all the results, giving equal weights to each comparison, is 6m. 19·06s.: the Observations from 1842 to 1845 give 6m. 19·00s., those of 1846, 6m. 19·22s.

II. *The Instruments.*

The Transit Instrument, by Tulley, has a focal length of 4 ft. 2 in., the diameter of the object glass being 3½ inches. The magnifying power of the eyepiece used is about 100.

The Declination Circle is by Simms. It is 2 feet in diameter, and is independently divided to 5′ of arc. It is read by two microscopes at the extremities of the horizontal axis.

The Clock is a very excellent one by Hardy, furnished with Hardy's escapement.

The Equatoreal is by Utzscheider and Fraunhofer. Its focal length is 8 feet 3 inches, and the aperture of its object glass 6½ inches.

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The Observatory is indebted to the munificence of the late Duke of Northumberland for a second Equatoreal, by Ross, of 7ft. 4in. focal length, and 5in. aperture; but no Observations with this instrument are contained in the present series.

The Transit Clock can be heard and seen from the Dome of the Equatoreal, and is, therefore, employed with this Instrument.

III. *Transit Observations.*

The general method of observing is to take the second from the clock face and preserve the counting till the Transit is completed, when it is verified by looking at the clock.

Previously to February, 1848, the Transit Instrument carried five vertical wires at the focus of the eye-piece, called A, B, C, D, E, when the Illuminated end of the Telescope is East, and the star observed above the Pole. A new system of wires was then substituted, and two additional wires B′, D′, were inserted between the middle wire and the two adjacent wires.

For the correction of imperfect Transits, the intervals of the wires from the mean of all were determined in January, 1845, from twenty complete Transits of Polaris, observed between Nov. 11, 1843, and June 3, 1844. The values then found were employed for Observations made up to December 29, 1846, when a new set came into use determined from twelve complete Transits of Polaris, observed between September 28, 1846, and February 12, 1847. The two sets are as follows:—

INTERVAL OF EACH WIRE FROM THE MEAN.

For an Equatoreal star

	1845.	1847.
	s	s
A	+ 37·499	+ 37·514
B	+ 18·696	+ 18·728
C	— 0·014	— 0·018
D	— 18·746	— 18·798
E	— 37·435	— 37·425

For the new system of wires, the intervals from the mean were determined in April, 1848, by means of ten complete Transits of Polaris, extending from February 23, to April 14, and found to be:—

For an Equatoreal star

	s
A	+ 37·413
B	+ 18·715
B′	+ 9·374
C	— 0·024
D′	— 9·364
D	— 18·720
E	— 37·396

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These values were employed for Observations from February, 1848. The intervals were computed independently for Polaris, δ Ursæ Minoris, and 51 (Hev.) Cephei. The methods of calculation and use are the same as those explained in the introductions to the volumes of Greenwich Observations, the factor

$$\left\{1 + \frac{\text{hourly increase of R.A. in seconds of time}}{60 \times 60}\right\} \times \text{secant declination}$$

being employed for imperfect Transits of the Sun and Venus, and the factor

$$\frac{3600 + \text{I}}{3600} \times \frac{\text{sin. Moon's geocentric Z.D.}}{\text{sin. Moon's apparent Z.D.}} \times \text{secant Moon's geoc. declination}$$

for those of the Moon.

From the known distances of the wires from the mean a table is computed for all the combinations which can be formed of the quantity

$$\frac{\text{Sum of the distances of omitted wires from the mean}}{\text{Number of observed wires}}$$

which gives a number to be multiplied by the secant of declination of the observed stars.

When both limbs of a Planet have been observed, one limb has generally been observed at three wires, and the other at two, or one at four and the other at three, but in some cases both limbs have been observed at all the wires.

Instrumental Corrections.

The Observations made previously to October, 1846, are subject to some uncertainty on account of the unsteadiness of the Collimation. But those made on nights when the uncertainty appeared to be considerable, have been altogether rejected, or only such particular observations retained as could be corrected by means of fundamental stars of nearly the same declination. On a few nights, three of which are mentioned under the star, No. 65, of the Catalogue, the correction has been found from the Transits themselves, a method which appears to be applicable for finding the errors of Collimation and Azimuth when the stars employed are Polaris, a group of stars near the zenith and a group of low southern stars. No observations of the Moon have been omitted: but a list is given of all observed Right Ascensions of the Moon and Moon-Culminating Stars.

On October 6, 1846, I found that the screws of the frame which carries the wires could be more firmly fixed. The error of Collimation has since that time been very steady, varying within the following limits:—

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	Extreme values. Illuminated End East.	No. of Determinations.	
	s. s.		
Oct. 6, 1846 to Jan. 29, 1847	+ 0·519 and 0·592	4	Jan. 29, wires moved.
Jan. 29, 1847 .. Ap. 27, 1847	— 0·146 .. — 0·181	3	
Ap. 27, 1847 .. Jan. 12, 1848	+ 0·183 .. + 0·235	6	Jan. 12, Eye-piece sent to Mr Simms.
Jan. 12, 1848 .. July 31, 1848	— 0·048 .. — 0·099	4	

The correction is expressed in decimals of a second of time. The change on April 27, 1847, was the result of a blow given to the eye-piece on hastily closing the shutters in a hurricane of wind.

The Observations for finding the error of collimation are made by means of a double-Image Dynameter eye-piece and North and South marks, placed in the principal foci of Lenses fixed in the skirting walls of the Observatory. The value of a Revolution of the Dynameter screw in arc is determined from the known intervals of the wires. As the Telescope in pointing to the marks is depressed 15° from the horizontal, a correction

$$= \tfrac{1}{2} \text{ sin. } 15^{\circ} \times \text{ change of Level in reversion of instrument}$$

is taken into account, with the proper sign; the collimation for the mean of the wires is then deduced from that for the middle wire, the sign of the difference varying according to circumstances; and the result is finally combined with the correction — 0·013^{s} for diurnal aberration.

The instrument has always been subject to considerable variations of level and azimuth, though to a less amount in the later observations. But the effect of these errors is inconsiderable, provided they remain steady throughout the same group of Observations, and there be means of determining the azimuthal error from day to day, as is generally the case.

When this error is found in the usual manner from the Observations, an erroneous level error has no effect in the determination of differences of Right Ascensions, except a very small one which may arise from an erroneous clock-*rate*. If the level error be altogether neglected, then a' being the false azimuthal error so found, l and a the true errors of level and azimuth in units each of which is 15″ of arc; λ the latitude; it is found that

$$a = a' + l \text{ tan. } \lambda$$

and the whole effect of the two errors on the transit of a star, declination $= d$, is

$$= l. \frac{\text{cos. } (\lambda - d)}{\text{cos. } d} + (a' + l \text{ tan. } \lambda), \frac{\text{sin. } (\lambda - d)}{\text{cos. } d}$$

$$\text{which} = \frac{l}{\text{cos. } \lambda} + a', \frac{\text{sin. } (\lambda - d)}{\text{cos. } d}$$

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when the factor of a' is the same as that of a, and the term $\frac{l}{\cos.\lambda}$ is independent of the Declination.

Consequently the error arising from neglecting the correction for level, is eliminated on applying the clock errors. But to find the true clock error it is necessary to take account of the term $\frac{l}{\cos.\lambda}$.

The correction for level has, however, been found by frequent observations, and applied in the usual manner. It is determined by means of a spirit level, placed upon the pivots. It is combined with a correction for the inequality of the radii of the pivots, amounting to $0{\cdot}14^s$ ascertained from a considerable number of observations of the level error, made immediately before and after the reversion of the Telescope.

The azimuthal error is determined in most cases either from one observation of Polaris combined with two or three observations of other Stars, or from combined observations of δ Ursæ Minoris and 51 (Hev.) Cephei, made at the same time. The stars selected for this purpose are those observed as near as possible to the observations of each night. Observations made in the day time are consequently subject to uncertainty on account of the unsteadiness of the instrument in level and azimuth. This remark applies especially to observations of the Sun.

Clock Errors.

The places of the fundamental stars have been taken without correction from the Nautical Almanac for each year. The observations of these stars are not contained in the catalogue.

The clock has generally a small losing rate.

Other Corrections.

The Reduction of the apparent Right Ascension at the time of observation to the mean Right Ascension for Jan. 0, preceding, has been made by the formula

$$Aa + Bb + Cc + Dd$$

the logarithms of A, B, C, D being taken from the Nautical Almanac, those of a, b, c, d from the British Association Catalogue; but when the star is not included in that Catalogue, the latter quantities have either been formed by interpolation from those of stars very near them, or computed by the appropriate formulæ.

When the Sun, Moon, or Planets have been observed at one Limb only, the semidiameter has, in all cases, been taken from the Nautical Almanac, in deducing the Right Ascension of the Centre.

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When both limbs of the Moon are observed, the correction for defect of illumination is semidiam. × versin θ. where θ is the excess or defect of the difference of Right Ascension of the Sun and Moon from 12h. at the time of the Moon's Transit expressed in arc, and multiplied by the cosine of the Sun's declination.

No correction for defect of illumination has been applied to the meridian observations of the Planets.

IV. *Circle Observations.*

In the early part of 1846 there were two horizontal wires, a fixed and a moveable wire. Observations were then made by keeping the two wires close together, and touching the Telescope with the hand till the object moved between them. In the course of that year the moveable wire was broken, and the object observed was subsequently made to run along the remaining wire.

In Feb., 1848, the moveable wire was reinstated by Mr. Simms, and the observations have since been made as at first. The Circle is read to 5′ by means of a pointer, the remaining minutes and seconds by micrometers of the usual construction.

The error of Runs appears to remain nearly constant in both positions of the instrument, being about — 4″·5 for 5′ when the illuminated end is West and nearly insensible when it is East. It is observed at least after each reversion.

The Refractions are computed by Bessel's Refraction Tables, given in the Appendix to the Greenwich Observations for 1836. The internal Temperature is assumed to be the same as the external. The Thermometer is fixed to the wall of the Observatory, close to the Northern shutter.

The latitude assumed in the computations is 54° 46′ 6″

The Equatoreal or Polar Point of the circle is determined by observation of the fundamental stars of the Nautical Almanac, whence the places are taken in each year, without correction. No observations by Reflection have been made.

The Reduction of the apparent North Polar Distance of stars at the time of observation to the mean North Polar Distance for Jan. 0, preceding, has been made in the same manner as that of Right Ascension.

The North Polar Distances of the Moon's centre have been deduced from observations of the bright limb only.* In observing Planets, the North or

* In a few instances when the observation was not made at the middle wire, a correction has been applied for the Moon's motion in the interval, depending on the horary variation given in the Nautical Almanac ; but in one or two of the early observations, which were made under these circumstances, I omitted to notice the time, and there are no means of discovering which results are affected with this error.

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south limb has been taken indifferently. The Parallax of the Moon's limb has been computed by the formula:—log. seconds of P^x = log. seconds of horizontal equatoreal P^x + log. sin. (zen.-dist. — 10′.40″) + 9·9990500 +

$$\log. \frac{\text{sin.}}{\text{arc}} (\text{of hor. } P^x) + \log. \frac{\text{arc}}{\text{sin.}} (\text{of } P^x).$$

the horizontal equatoreal parallax being interpolated with second differences from the Nautical Almanac. For the Parallax of the Planets, the formula employed is:—log. P^x = log. sin. (zen.-dist. — 10′.40″) + A.C. log. dist. + 0.9324. The Moon's semidiamter used in deducing the North Polar Distance of the Centre, depends upon the expression:—log. semidiam. = log. equatoreal horizontal P^x + 9·4353680 + log. $\frac{\text{sin.}}{\text{arc}}$ (of hor. P^x). The semidiameters of the Planets are taken from the Nautical Almanac.

V. *Observations with the Equatoreal.*

The observations of the Moon's Diameter are made with a Wire Micrometer, the wires being set in the direction of the Meridian by moving them till the North or South Limb of the Moon moved along a transverse wire.

The Eclipses of Jupiter's Satellites and Occultations of Stars by the Moon, were observed with a Ramsden's Eye-piece, magnifying power about 70.

The observations of Neptune and Flora were made with the Wire Micrometer. This instrument is furnished with two wires moveable by Micrometer Screws, and three fixed wires transverse to the former. In 1846 there was but one fixed wire: the observations of Right Ascension and North Polar Distance were, therefore, made separately, the wires being turned round through 90° between them. Four additional wires were then inserted by Mr. Simms, but too close to be all employed, and two of them were shortly afterwards found to be broken. It is now customary to use two or sometimes all the three remaining fixed wires in observing differences of Right Ascension. They are not equidistant. Each of the screws has a run amounting to about 8″, loose from its wire. But it is found that any error from this source is avoided by turning them always in the same directions to bisect the objects to be observed. The difference of North Polar Distance of two objects is found by adding together the two screw readings, and subtracting the sum of the readings when the wires turned in the same directions have been brought just to coincide. This Zero point remains constant, or very nearly so. The number of whole Revolutions is read upon an Index Plate.

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This method of observation was not, however, employed till Dec. 3, 1847. In the previous observations, one of the moveable wires was kept fixed, and the Telescope moved by the Tangent-screw till one object was brought upon it; the other object was then bisected by the moveable wire which was brought up to coincidence with the fixed wire after each set of observations, and the Zero observed.

As the eye-piece is removed from time to time, it is generally necessary to set the wires in position before observing. This is done by turning them till a star moves along one of the Declination wires. The difficulty of setting them exactly appears to be a source of error in the observations of Right Ascension, when the difference of North Polar Distance is considerable.

Both elements are observed in the same passage through the field, the object being bisected by the moveable wire as nearly as possible to the Centre.

The value of a Revolution of either screw in arc has been determined by observing differences of North Polar Distance of known stars in revolutions, the differences in arc being obtained by computing the places of the stars at the times of observation from the Greenwich Catalogue of 1439 stars, by means of the constants a' b' c' d', of the British Association Catalogue. The corrections for Refraction were applied. The results of these observations are as follows:—

Time of Observation.	Temperature.	Stars employed. Nos. in Greenwich Cat.	Value of 1r of screw.	No. of Observations.
1848			"	
Dec. 13	12·5C	1337 and 1340	20·045	5
—	—	1313 — 1314	20·002	6
Dec. 16	5°	1313 — 1314	20·000	2
—	—	1395 — 1400	19·894	5
Dec. 28	4°	50 — 57	20·030	5
—	—	203 — 206	20·012	2

The proper motion of the star 57 (μ Cassiopeæ) given in the Greenwich Catalogue has been applied.

The mean of all the results is $1^r = 19''{\cdot}997$. The value has been assumed $= 20''{\cdot}00$ in all the observations contained in this volume. Since the sum of the screw readings at the coincidence of the wires is the same, in whatever part of the field it take place, it follows that the two screws are equal.

Observations made for the same purpose by Transits of Polaris were found to give less consistent results.

The corrections for Refraction and Parallax have been applied to the mean of each set of observations. Those of Refraction are computed by the formulæ: —(Z Q being the perpendicular from the zenith Z to the meridian P S through the pole P and object S).

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$$\text{Refraction in N.P.D.} = 57'' \times \tan.(PS - PQ).$$

$$\text{Refraction in R.A.} = \left(\frac{57}{15}\right)^{s} \times \frac{\tan. ZQ}{\sin. PS \times \cos.(PS - PQ)}.$$

The corrections for Parallax of all bodies in the solar system, except the Moon, depend on the formulæ.

$$\text{Parallax in N.P.D.} = k \times \text{Equatoreal horizontal P}^{x}.$$

$$\text{Parallax in R.A.} = m \times \text{Equatoreal horizontal P}^{x}.$$

where, (Z′Q′ being the perpendicular from the geocentric zenith Z′ upon PS),

$$k = \cos. Z'Q' \sin.(\text{N.P.D.} + P.Q'.)$$

$$m = \frac{1}{15} \frac{\sin. Z'Q'}{\sin. \text{N.P.D.}}$$

Tables have been computed containing the values of P Q and tan. Z Q for every 10^{m} of hour angle, and of *m* and *k* for every 5^{0} of N.P.D., and every 10^{m} of hour angle; by means of which the corrections are very readily found. The assumed places of the stars of comparison have been derived from the places contained in the following tables:—

STARS WITH NEPTUNE.

Star.	Epoch.	Assumed R.A.	Assumed N.P.D.	Authority.
		h. m. s.	° ′ ″	
B.A.C. 7648	Jan. 0, 1846	21. 50. 5·90	103. 23. 56·6	Greenwich Observations, 1846, & Professor Challis, in monthly notice of Roy. Ast. Soc. for March, 1847.
38 Aquarii	Jan. 0, 1847	22. 2. 26·48	102. 18. 53·3	Observations contained in this Volume.
40 Aquarii	Jan. 0, 1847	22. 5. 15·28	102. 40. 47·7	

STARS WITH FLORA.

Star.	Epoch.	Assumed R.A.	Assumed N.P.D.	Authority.
		h. m. s.	° ′ ″	
a	Oct. 27, 1847	5. 5. 58·91	76. 4. approx.	Two comparisons with B.A.C., 1500.
B.Z. iv. 1312	Nov. 1, ..	4. 58. 7·95	76. 7. 13·1	
B.A.C. 1500	Nov. 16, ..	4. 43. 57·40	76. 0. 31·3	Mean of Durham Obs. and Edinburgh Obs., 1837.
.. 1409	Dec. 11, ..	4. 25. 14·75	75. 28. 54·7	Edinburgh Obs., 1837, and Greenwich Cat. of 1439 stars.
.. 1329	Jan. 5, 1848	4. 11. 14·56	73. 51. 0·5	One Merid. Obs., Dec., 1848.
.. 1350	Jan. 11, ..	4. 14. 43·24	73. 35. 4·8	Edinburgh Obs., 1837.
.. 1346	Jan. 13, ..	4. 14. 11·62		Greenwich Cat. of 1439 stars.
.. 1356	Jan. 13, ..	4. 15. 21·54	72. 54. 53·3	
H.C. 8125	Jan. 26, ..	4. 12. 44·92	71. 56. 59·3	One Meridian Obs., Dec., 1848.
B.A.C. 1361	Jan. 28, ..	4. 16. 7·08	71. 18. 50·6	
ε Tauri	Feb. 1, ..	4. 19. 45·67	71. 9. 48·8	Greenwich Cat. of 1439 stars.
B.A.C. 1417	Feb. 10, ..	4. 26. 49·26	70. 26. 22·5	One Merid. Obs., Jan. 1849.
H.C. 8844	Feb. 19, ..	4. 34. 8·12	69. 40. 6·2	
B.A.C. 1620	Mar. 7, ..	5. 6. 20·41	67. 53. 47·4	

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When the same star has been observed on several nights its place has been computed for each, or interpolated in an Ephemeris for every ten days. The formulæ employed are $Aa + Bb + Cc + Dd$ and $Aa' + Bb' + Cc' + Dd'$ when the star is one of the British Association Cat.; in other cases Bessel's formulæ have been used, the quantities f, g, G, h, H, i, being taken from the Nautical Almanac.

The Double-image Micrometer was constructed by Messrs. Troughton and Simms. It has been applied according to the instructions given in the Introductions to the Volumes of Greenwich Observations. The method of equal distances has been followed in all the observations of double stars. As the eye-piece is necessarily removed from time to time the circle reading of the Polar Point is found for the observations of each night. The value of a Revolution of the Screw has been ascertained by separating the images of a star and observing the times of transit across a fixed wire set parallel to the meridian. The following are the results of separate determinations:—

Day of Observation.	Temperature.	Distance measured.	Star.	Value of 1r.
	°	r		″
1847—Feb. 17	5 C	10	Procyon	18·36
.. .. 25	3	5	δ Orionis	18·42
.. Mar. 13	7	5	θ Urs. Maj.	18·69
.. ..	7	5	—	18·73
... June 2	20	5	β Cephei	18·60
.. Oct. 11	14	5	α Cephei	18·43
1848—Mar. 24	..	5	θ Urs. Maj.	18·56

The first measures were made by separating the images 13^r and then 3^r, and subtracting the less time of transit from the greater to eliminate the zero point; all the other measures were made in a similar manner. It would have been better to separate the images an equal number of revolutions on opposite sides. The value assumed is in all cases 18″6.

The measured equatoreal diameters of Jupiter have been corrected for defect of illumination by the quantity semidiam. × versin θ, when θ is the difference between the geocentric and heliocentric longitudes of the planet.

VI. *Explanation of the Printed Results.*

1. In the *Observations of Stars*, the result of each observatiou is given separately.

The name of the star in the third column, is in all cases either the Greek letter, or Flamsteed's number, with the name of the constellation.

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In the column, *No. of wires,* when no number is expressed, the observation is complete, or, from Feb., 1848, is made at one of the two sets of five equidistant wires. The mean of both is sensibly the same as that of all the seven, when the N.P.D. exceeds 30°. The seventh column is employed when the star has been observed in different years, to facilitate the comparison of the results with each other.

2. *Right Ascensions of the Moon's Limb, and of Moon-culminating Stars.* The names of the stars are those of the Nautical Almanac. The places here given, are the Apparent Right Ascensions at the times of observation. In one or two instances, when there are no Moon-culminating stars, other stars lying near the Moon's parallel have been inserted.

3. *Observations of the Sun, Moon, and Planets.* In the observations of the Sun's diameter the single star (*) implies that one or both limbs has been observed at either three or four wires; the double star (**), that one or both limbs has been observed at less than three wires.

In the list of Right Ascensions of the Sun's Centre, no observations have been inserted except those which are corrected by Clock stars observed either on the night preceding or that following the observation. The seconds of the Nautical Almanac have, in all cases, been corrected for the motion of the body during $6^m\,18^s$ ($= 0^h\cdot105$) the assumed longitude.

The Results marked † are from Observations by the Professor of Mathematics and Astronomy.

The first observations of each particular kind were made under the disadvantage of previous inexperience. The Reductions have been carefully made, and have been generally revised; but in certain cases, the agreement of different results of the same kind has been considered a sufficient test of their accuracy.

The original observations are preserved at the Observatory.

ROB$^{T.}$ ANCHOR THOMPSON, Observer.

Observatory, Durham, April 20th, 1849.

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CONTENTS.

PAGE

INTRODUCTION— iii

Latitude and Longitude iii

Instruments iv

Transit Observations v

Correction of Imperfect Transits v

Instrumental Corrections vi

Clock Errors viii

Circle Observations ix

Observations with the Equatoreal x

Value of Micrometer Screw in Arc xi

Stars observed with Neptune and Flora xii

Double-Image Micrometer xiii

Explanation of the Printed Results xiii

Observed Right Ascensions and North Polar Distances of Stars.

Right Ascensions of the Moon and Moon-Culminating stars.

Horizontal Diameters of the Sun, Moon, and Planets.

Right Ascensions of the Sun.

Right Ascensions and North Polar Distances of the Moon and Planets.

Transits of the Moon's Diameter, with the Equatoreal.

Eclipses of Jupiter's Satellites.

Occultations of Stars by the Moon.

Right Ascensions and North Polar Distances of Neptune and Flora.

Observations of Double Stars, and Diameters of Planets.

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OBSERVATORY, DURHAM.

OBSERVATIONS OF STARS,

WITH THE

CONCLUDED RIGHT ASCENSIONS and NORTH POLAR DISTANCES,

REDUCED TO JANUARY 1, 1850.

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OBSERVATIONS OF RIGHT ASCENSION.

Number for Reference.	No. in British Association Catalogue.	Name of Star.	Date of Observation.	No. of Wires.	Seconds of Mean R.A. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean R.A., Jan. 1, 1850.
					s.	s.	h. m. s.
1	62	1 Ceti	1846. Oct. 10	3	34·91		0.11.47·15
2	95	10 Ceti	1848. Jan. 11		49·75		0.18.55·89
3	448	μ Piscium	1847. Oct. 23		10·27		1.22.19·62
4	595	48 Cassiopeæ					
5	683	19 Arietis	1847. Oct. 27		42·95		2. 4.52·70
6	780	ω Arietis	1847. Oct. 25		31·91		2.24.41·73
7	798	υ Arietis	1847. Oct. 19		17·82		2.28.27·54
8	986	δ Arietis	1846. Dec. 1		50·07	3·68	
			1848. Feb. 11		56·69	3·50	3. 3. 3·59
9	1328	γ Tauri	1846. Dec. 2		2·07	15·65	
			1848. Feb. 11		8·85	15·64	4.11.15·64
10	1500	o' Orionis	1847. Nov. 26		52·98	3·14	
			Dec. 3		52·99	3·15	
			1848. Jan. 5	4	56·33	3·10	4.44. 3·13
11	1551	ι Tauri	1846. Mar. 4	3	54·03	8·32	
			5		53·95	8·24	
			Dec. 30	1	53·78	8·07	4.54. 8·21
12	1591	15 Orionis	1846. Jan. 8		53·25		5. 1. 6·96
13	1656	.....	1846. Feb. 4	3	20·65	33·69	
			6	4	20·57	33·61	
			7		20·68	33·72	
			11		20·55	33·59	
			12		20·70	33·74	
			Mar. 5		20·60	33·64	
			1847. Jan. 15		23·90	33·68	
			28		24·04	33·82	
			Feb. 8		24·11	33·89	5.13.33·71
14	....	.....	1847. Jan. 28	1	24·65	42·69	
			Feb. 11	2	25·10	43·14	5.18.42·91
15	1826	.....	1846. Jan. 23		24·93	38·10	
			29		24·92	38·09	
			Feb. 4		24·85	38·02	
			5		25·07	38·24	

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OBSERVATIONS OF NORTH POLAR DISTANCE.

Date of Observation.	Seconds of N.P.D. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean N.P.D. Jan. 1, 1850.	
	"	"	° ′ ″	
1846. Oct. 10	45·7		99.39.25·6	
1848. Jan. 11	28·5		90.52.48·5	
1846. Oct. 10	38·8		19.49.27·6	
1847. Oct. 27	21·6		75.25.30·2	
1847. Oct. 25	42·2		75.37.53·6	
1847. Oct. 19	8·0		78.12.20·0	
1846. Dec. 1	34·4	38·4		R.A. uncertain on Dec. 1.
1848. Feb. 11	8·4	40·4	70.50.39·4	
1848. Feb. 11	41·0		74.44.22·7	Dec. 2, bad; intervals irregular.
1847. Nov. 26	28·6			
Dec. 3	28·8		76. 0. 9·1	
1846. Feb. 11	43·2	27·0		
Mar. 5	44·2	28·0		R.A. uncertain on Feb. 8.
1847. Jan. 15	44·4	32·3		
Feb. 8	40·5	28·4	81.43.28·9	
1847. Feb. 11	47·0		23.47.36·2	Faint; both observations uncertain; another star precedes about 2^m.
1846. Feb. 11	24·7	17·2		The larger of two stars in the same field.
Mar. 4	24·6	17·1		
Mar. 11	23·1	15·6		
1847. Jan. 14	18·8	13·2		

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OBSERVATIONS OF RIGHT ASCENSION.

Number for Reference.	No. in British Association Catalogue.	Name of Star.	Date of Observation.	No. of Wires.	Seconds of Mean R.A. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean R.A., Jan. 1, 1850.
					s.	s.	h. m. s.
15	1826	*(continued)*	1846. Feb. 6		24·81	37·98	
			7		24·89	38·06	
			11		25·15	38·32	
			Mar. 4		24·99	38·16	
			1847. Jan. 14		28·22	38·10	
			28		28·36	38·24	
			Feb. 8		28·31	38·19	5.38.38·14
16	1958	ν Orionis	1846. Mar. 5		46·75		5.59. 0·44
17	2002	η Geminorum	1847. Feb. 24		38·57		6. 5.49·45
18	2020	4 Lyncis	1846. Mar. 7	3	23·50		6· 8.44·83
19	....	.....	1846. Mar. 11	3	47·48	1·00	
			12	3	47·60	1·12	
			1847. Feb. 25		50·88	1·02	6.16. 1·05
20	2070	.....	1847. Jan. 14		10·41		6.17.20.42
21	....	.....	1846. Mar. 7		58·23	11·75	
			11		58·27	11·79	
			1847. Jan. 15	4	1·56	11·70	
			Feb. 2	3	1·57	11·71	
			8		1·34	11·48	6.18.11·69
22	2163	γ Geminorum	1846. Feb. 7		48·80	2·66	
			1847. Jan. 28		52·20	2·59	6.29. 2·62
23	2206	ξ^2 Geminorum	1846. Mar. 7		38·88		6.36.52·39
24	2305	ζ Geminorum	1846. Feb. 7	3	58·22	12·47	
			1847. Feb. 24	2	2·10	12·79	
			25		2·06	12·75	6.55.12·67
25	2358	22 Monocerotis	1846. Mar. 14		0·06	12·32	
			1848. Feb. 25	6†	5·97	12·10	7. 4.12·21
26	2462	β Canis Minoris	1846. Mar 14		47·92	0·96	
			1847. Jan. 28		51·03	0·81	
			Feb. 19		51·17	0·95	
			Mar. 18		51·06	0·84	7.19. 0·89
27	2486	68 Geminorum	1847. Jan. 29		52·36	2·65	
			1848. Feb. 15	7†	55·66	2·52	
			16		55·76	2·62	7.25. 2·60

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OBSERVATIONS OF NORTH POLAR DISTANCE.

Date of Observation.	Seconds of N.P.D. reduced to Jan. 1, preceding.	Seconds reduced to Jan. 1, 1850.	Mean N.P.D., Jan. 1, 1850.	
	"	"	° ′ ″	
1847. Jan. 28	20·5	14·9		
Feb. 8	19·4	13·8	80.32.15·3	
1847. Feb. 24	19·0		67.27.20·5	
				Not good.
1847. Feb. 25	35·8		76.54.41·8	
1847. Jan. 14	52·9		78.41.57·4	Not the brightest star in the field.
1846. Mar. 7	35·6	42·0		
1847. Jan. 15	39·5	44·3		Feb. 8, bad observation; intervals irregular.
Feb. 8	40·4	45·2		
March 19	38·6	43·4	76.48.43·7	
1847. Jan. 28	29·5		73.28.37·1	
1847. Feb. 25	38 7		69.12.53·1	Feb. 24, faint; cloudy.
1847. Jan. 28	26·0			
Feb. 19	24·9			
March 18	26·4		81.24.46·1	
1847. Jan. 29	57·1	18·9		
1848. Feb. 16	68·3	22·8	73.51.20·8	

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OBSERVATIONS OF RIGHT ASCENSION.

Number for Reference.	No. in British Association Catalogue.	Name of Star.	Date of Observation.	No. of Wires.	Seconds of Mean R.A. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean R.A., Jan. 1, 1850.
					s.	s.	h. m. s.
28	....	.....	1846. Jan. 29		57·13	14·67	
			Mar. 11		57·10	14·64	
			1847. Mar. 19	4	1·24	14·39	7.23.14·57
29	2488	.....	1846. Jan. 29		23·06	37·59	
			Feb. 16		19·95	37·48	
			Mar. 5	4	20·01	37·54	
			7		20·09	37·62	
			12		19·77	37·50	
			1847. Jan. 14		24·27	37·42	
			28		24·36	37·51	
			Feb. 19		24·11	37·26	
			Mar. 19		24·28	37·43	7.25.37·48
30	....	.....	1846. Jan. 29		59·15	11·19	
			Feb. 3		59·27	10·31	
			Mar. 11	4	59·26	10·30	
			1847. Jan. 28	2	1·88	10·16	
			Feb. 8	2	2·06	10·34	
			12	4	1·90	10·18	
			19	4	2·06	10·34	
			22		1·86	10·14	
			24		1·92	10·20	
			Mar. 20		1·82	10·10	7.29.10·22
31	2511	.....	1846. Jan. 29		31·31	42·35	
			1847. Jan. 14		33·90	42·18	7.29.42·26
32	....	.....	1847. Mar 18		36·49		7.30.44·77
33	2551	κ Geminorum	1848. Feb. 15		15·68	22·95	
			16	7†	15·95	23·22	7.35.23·09
34	2639	1 Cancri	1846. Mar. 7		14·46		7.48.28·12
35	2658	.....	1847. Mar. 17		51·66		7.52. 2·07
36	2723	.....	1848. Mar. 19		35·73		
			April 1		35·59		
			3		35·56		8. 0.40·92
37	2739	.....	1848. Mar. 29		31·41		
			April 1		31·35		
			3		31·39		8. 2.36·87
38	2748	.....	1848. Mar. 29		51·76		
			April 1	4	51·68		
			3		51·68		8. 3.58·44

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OBSERVATIONS OF STARS.

OBSERVATIONS OF NORTH POLAR DISTANCE.

Date of Observation.	Seconds of N.P.D. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean N.P.D. Jan. 1, 1850.	
	"	"	° ′ ″	
1846. Mar. 11	26·6		43.32.55·1	Mar. 11, uncertain.
1846. Mar. 11	12·4	41·7		
7	14·2	43·5		
12	10·0	39·3		
1847. Jan. 14	22·9	44·9		
28	19·4	41·4		
Feb. 19	21·1	43·1		
22	18·4	40·4		
Mar. 19	16·2	38·2	43.29.41·6	
1846. Mar. 11	13·7	(44·3)		The largest star in a very rich field; B.A.C. 2511.
1847. Jan. 28	28·1	51·1		
Feb. 8	24·4	47·4		Mar. 11, uncertain.
12	30·7	53·7		
19	30·1	53·1		Feb. 8, hurried; intervals bad.
24	26·9	49·9	104.9.51·0	Feb. 19, bad illumination.
1847. Jan. 14	50·4		104.9.13·4	There are two larger stars in the same field.
1847. Mar. 18	1·5		104.6.24·7	
1848. Feb. 16	34·9		65.14.51·1	

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OBSERVATIONS OF RIGHT ASCENSION.

Number for Reference.	No. in British Association Catalogue.	Name of Star.	Date of Observation.	No. of Wires.	Seconds of Mean R.A. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean R.A., Jan. 1, 1850.
					s.	s.	h. m. s.
39	2749	.....	1847. Mar. 17		41·23		8. 4. 1·59
40	2761	.....	1848. Mar. 29	4	53·85		
			April 1		53·75		
			3		53·73		8. 6. 0·47
41	2782	.....	1843. Mar. 29		17·66		
			April 1		17·70		
			3		17·69		8. 9.21·19
42	2791	.....	1848. Mar. 29		50·25		
			April 1		50·30		
			3		50·33		8.11.56·60
43	2798	.....	1848. Mar. 29		24·28		
			April 1		24·24		
			3		24·21		8.14.32·42
44	2810	.....	1846. Mar. 29		6·02		
			April 1		6·20		
			8		6·12		8.16.13·01
45	2842	2 Ursæ Majoris	1848. April 3		55·75		8.21. 6·71
46	2852	.....	1848. Mar. 29	7	40·13		
			April 1	7	40·19		8.22.53·95
47	2853	θ Cancri	1848. Mar. 15	7†	55·25		8.23. 2·12
48	2876	3 Ursæ Majoris	1848. April 3		38·27		8.25.49·14
49	2887	.....	1848. Mar. 29		59·29		
			April 1		59·41		8.27. 8·50
50	2894	.....	1848. Mar. 29	4	7·96		
			April 1	4	7·98		
			3		7·99		8.28.15·29
51	....	.....	1848. April 1		22·09		
			3		21·93		8.30.28·93
52	2913	38 Cancri	1848. April 1		58·35		
			3		58·21		8.31. 5·20
53	2922	ε Cancri	1848. Mar. 29		43·57		8.31.50·48
54	2924	42 Cancri	1848. April 1		59·31		
			3		59·21		8.32. 6·18

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OBSERVATIONS OF NORTH POLAR DISTANCE.

Date of Observation.	Seconds of N.P.D. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean N.P.D., Jan. 1, 1850.	
	″	″	° ′ ″	
				In the same field with the following; probably 2906.

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OBSERVATIONS OF RIGHT ASCENSION.

Number for Reference.	No. in British Association Catalogue.	Name of Star.	Date of Observation.	No. of Wires.	Seconds of Mean R.A. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean R.A., Jan. 1, 1850.
					s.	s.	h. m. s.
55	2931	.....	1848. April 3		5·85		8.33.12·77
56	2940	9 Hydræ	1848. Mar. 29		40·16		
			April 1		40·03		8.34.45·66
57	2953	δ Cancri	1846. Feb. 10	4	55·69	9·38	
			Mar. 9		55·63	9·32	
			1848. Feb. 16		2·43	9·27	8.36. 9·32
58	2970	50 Cancri	1848. April 11	7	35·74		8.38.42·34
59	2987	14 Hydræ	1848. April 1		43·37		
			3		43·36		8.41.49·40
60	2999	51 Cancri	1848. Mar. 29		10·39		
			April 1		10·36		8.43.17·83
61	3013	.....	1848. April 1	4	22·28		
			3		22·35		8.44.28·67
62	3055	α Cancri	1848. Feb. 17	1†	10·06		
			April 11		10·02		8.50.16·62
63	3058	.....	1848. April 3		35·31		8.50.42·12
64	3083	.....	1848. April 3		34·86		8.54.43·43
65	3086	.....	1846. Feb. 13		42·41	1·37	
			Mar. 12		42·15	1·11	
			April 3	3	42·48	1·44	
			1847. Feb. 12		46·97	1·19	
			19	4	46·79	1·01	
			22		46·99	1·21	8.55. 1·22
66	3093	.....	1848. April 3	3	57·94		8.56. 4·99
67	3104	.....	1848. April 3		55·07		8.58. 1·75
68	3133	.....	1848. Mar. 7	4†	16·43		
			15	6†	16·22		
			29		16·16		
			April 3		16·21		9. 4.22·54
69	3146	θ Hydræ	1848. Mar. 29		27·19		
			April 3		27·21		9. 6.33·44
70	3164	.....	1848. April 3		36·17		9. 9.42·70

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OBSERVATIONS OF NORTH POLAR DISTANCE.

Date of Observation.	Seconds of N.P.D. reduced to Jan. 1, preceding.	Seconds reduced to Jan. 1, 1850.	Mean N.P.D., Jan. 1, 1850.	
	"	"	° ′ ″	
1848. Feb. 16	31·2		71.17.56·5	
1848. April 11	8·4		77.20.34·0	
1846. Mar. 12	45·6	41·1		
27	51·5	47·0		
April 3	53·2	48·7		
1847. Feb. 12	62·2	43·8		
19	59·2	40·8		
22	61·3	42·9	30. 3.44·0	The collimation on Feb. 13, Mar. 12, and April 3, 1846, has been found from the observations. On Mar. 12 and April 3, it agreed very nearly with that given by the Meridian Marks. Other observations in 1846 have been rejected.

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OBSERVATIONS OF RIGHT ASCENSION.

Number for Reference.	No. in British Association Catalogue.	Name of Star.	Date of Observation.	No. of Wires.	Seconds of Mean R.A. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean R.A., Jan. 1, 1850.
					s.	s.	h. m. s.
71	3206	.....	1848. April 3		11·58		9.16.18·37
72	3220	.....	1848. April 3		53·00		9.19. 1·74
73	3233	.....	1848. April 3	3	14·68		9.21.20·66
74	3250	ξ Leonis	1846. Mar. 9		38·41	51·41	
			1848. Feb. 17	7†	45·16	51·66	
			Mar. 15	7†	44·91	51·41	9.23.51·49
75	3265	.....	1848. Mar. 29		33·66		
			April 3		33·68		9.25.41·22
76	3286	10 Leonis	1848. Mar. 29		10·97		
			April 3		10·88		9.29.17·28
77	3310	.....	1848. Mar. 29		54·88		
			April 3		54·93		9.33. 0·76
78	3312	o Leonis	1848. Feb. 17	7†	2·16		9.33. 8·60
79	3313	13 Leo. Min.	1848. Mar. 7	7†	31·94		9.33.39·23
80	....	.....	1848. Mar. 29		29·15		9.43.36·36
81	3375	.....	1848. Mar. 7	6†	32·16		
			29		32·23		
			1848. April 3		32·21		9.44.39·41
82	3380	.....	1848. Mar. 29	4	43·84		
			April 3		43·77		9.45.50·12
83	3402	.....	1848. April 3		21·36		9.49.29·77
84	....	.....	1848. April 3		16·84		9.50.25·25
85	3415	π Leonis	1846. Feb. 10		4·31		9.52.17·03
86	3420	.....	1848. April 3		14·24		9.53.21·27
87	3427	.....	1848. April 3		6·25		9.55.13·30
88	3431	.....	1848. April 3		23·57		9.55.30·61
89	3438	.....	1848. April 3		51·25		9.56.57·53
90	3486	20 Sextantis	1846. April 20	3	5·00		10.6.16·99

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OBSERVATIONS OF NORTH POLAR DISTANCE.

Date of Observation.	Seconds of N.P.D. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean N.P.D. Jan. 1, 1850.	
	"	"	° ′ ″	
				Intervals irregular; hurried.
				Mar. 29, cloudy.
				Mar. 29, cloudy.
			54.19	
			32.28	
1846. April 20	28·9		96.38.39·5	

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OBSERVATIONS OF RIGHT ASCENSION.

Number for Reference.	No. in British Association Catalogue.	Name of Star.	Date of Observation.	No. of Wires.	Seconds of Mean R.A. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean R.A., Jan. 1, 1850.
					s.	s.	h. m. s.
91	3529	.....	1846. April 20		38·60	41·19	
			1848. Mar. 29		34·57	40·86	10.12.41·02
92	3553	.....	1848. Mar. 7	4†	50·75		
			29		50·59		10.15.56·75
93	3570	26 Sextantis	1846. April 20		45·26	57·53	
			1847. April 30	2	48·19	57·39	10.18.57·46
94	3592	.....	1848. Mar. 29	4	53·79		10.21.59·98
95	3608	32 Sextantis	1848. Mar. 29	4	24·43		10.24.30·67
96	3609	ρ Leonis	1848. April 13	7	48·24		10.24.54·57
97	3629	.....	1846. April 20	3	56·96		10.28.22·70
98	3637	.....	1847. April 30	4	59·90	8·77	
			1848. Mar. 29		2·83	8·74	10.30. 8·75
99	3640	37 Leo. Min.	1848. Mar. 15	7	9·20		10.30.16·00
100	3662	.....	1846. April 21	3	33·92	46·60	
			1848. Mar. 29		40·16	46·50	10.33.46·55
101	3684	36 Sextantis	1847. April 30		16·16	25·45	
			1848. Mar. 29		19·41	25·61	10.37.25·53
102	....	.....	1848. Mar. 29		38·77		10.38.44·97
103	3715	ν Hydræ	1847. April 30		4·66		10.42.13·56
104	3726	.....	1846. April 20		18·87	31·21	
			1848. Mar. 29		24·92	31·19	10.44.31·20
105	3732	.....	1846. April 21		53·23	5·47	
			1847. Mar. 22	3	56·31	5·49	
			1848. Mar. 29		59·25	5·37	10.46. 5·44
106	3741	.....	1848. Mar. 29		18·33		10.47.25·04
107	3751	50 Leo. Min.	1847. April 30	4	15·70		10.48.25·52
108	3760	.....	1848. Mar. 29		42·06		10.51.48·95
109	3768	58 Leonis	1848. April 13		42·49		
			14		42·47		10.52.48·68

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	"	"	° ′ ″	
1846. April 20	46·9		82.48.58·5	Mar. 29, hurried.
				Mar. 7, bad observation.
1846. April 20	24·0	36·6		
1847. April 30	43·1	37·5	90.13.37·0	
				Illumination bad.
1848. April 13	47·1		79.55.23·8	
1846. April 20	25·4		8.47.39·3	
1847. April 30	23·7		102.36.19·3	
1846. April 21	25·0		78.28.39·6	
1847. April 30	32·2		86.43.28·5	
.....			86.43....	
1847. April 30	35·4		105.24.32·1	
1846. April 20	31·7		88.10.47·6	April 20, intervals irregular,
1846. April 20	38·4	54·5		N. F of two.
21	42·3	58·4		
1847. Mar. 22	1·6	58·7	91.19.57·2	
1847. April 30	6·4		63.42. 3·7	
1848. April 13	4·5		85.34.42·9	

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OBSERVATIONS OF RIGHT ASCENSION.

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					s.	s.	h. m. s.
110	3780	.....	1846. April 20		40·89		
			21		40·77		10.55.53·33
111	3788	χ Leonis	1846. April 28	4	4·03		10.57.16·52
112	3816	66 Leonis	1846. April 21		21·90		11. 1.34·17
113	3821	.....	1846. April 28		16·15	31·91	
			29	4	16·38	32·14	
			1847. Mar. 22		20·69	32·51	
			April 5		20·42	32·24	
			30	2	20·33	32·15	
			1848. Mar. 29		24·04	31·92	11. 2.32·15
114	3836	.....	1846. April 20	3	58·87	11·22	
			1848. Mar. 29		4·73	10·90	11. 6.11·05
115	3862	σ Leonis	1848. Mar. 29		17·73		
			April 14		17·71		11.13.23·93
116	3869	71 Leonis	1848. Mar. 29		31·19		11.14.37·50
117	3886	81 Leonis	1846. April 21		34·27	46·86	
			28		34·40	46·99	
			29		34·33	46·92	
			1847. Mar. 22		37·50	46·94	
			1848. Mar. 29		40·41	46·70	
			May 3		40·48	46·77	11.17.46·86
118	3894	83 Leonis	1847. Mar. 30	2	0·52		11.19. 9·65
119	3900	τ Leonis	1847. Mar. 29		4·14	13·40	
			30	2	4·07	13·33	
			1848. April 14	7	7·08	13·25	11.20.13·33
120	3904	.....	1848. Mar. 29	4	20·62		
			May 3	6	20·76		11.20.27·72
121	3925	.....	1848. Mar. 29		3·95		
			May 3	5	4·04		11.25.10·09
122	3942	.....	1848. Mar. 29		51·33		
			May 3		51·23		11.28.58·13
123	3966	62 Ursæ Majoris	1846. April 28		32·68	45·26	
			May 11	4	32·68	45·26	
			1847. May 4		35·84	45·38	
			1848. Mar. 29		38·92	45·22	11.33.45·25

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	″	″	° ′ ″	
1846. April 20	18·9			
21	18·0			
29	22·1		81.36.36·8	
1846. April 28	0·5		81.51.16·7	Doubtful; collimation uncertain on April 28.
1846. April 21	59·6		90.31.19·0	Proper motion in N.P.D. = + 0″·05.
1846. April 28	45·1	(62·8)		April 28, doubtful.
29	43·6	(61·3)		April 30, hazy; star just visible.
1847. Mar. 22	52·0	50·3		The reductions of N.P.D. on April 28
April 5	54·2	52·8		and 29 have beon carefully exa-
1848. Nov. 7	12·2	51·1	20.54.51·4	mined.
1846. April 20	31·8		86.54.49·8	The N.P.D. of B.A. Cat. is 1′ in error.
1848. April 14	18·1		83. 8.57·4	
1846. April 21	51·9	10·8		
29	47·4	6·3		
1847. Mar. 22	12·7	11·9	72·43· 9·7	
				Proper motion in R.A. = — 0ˢ·051.
1847. Mar. 29	3·7	3·0		
30	2·0	1·3		
1848. April 14	25·8	5·3	86·19. 3·2	
1846. April 28	43·7		97. 0. 3·0	
1846. April 28	9·2	28·8		Proper motion in R.A. = — 0ˢ·024
May 11	3·1	22·7		in N.P.D. = — 0″·03.
1847. May 4	23·8	23·5	57.25.25·0	

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					s.	s.	h. m. s.
124	3981	χ Ursæ Majoris	1848. Mar. 29		0·08		11.38. 6·51
125	3985	.....	1848. May 3	7	45·60		11·38.52·11
126	3996	.....	1848. Mar. 29		19·61		11.41.25·77
127	4002	β Virginis	1847. Mar. 29		43·59	52·96	
			30	4	43·59	52·96	
			1848. May 13	7	46·48	52·72	11.42.52·88
128	4005	.....	1847. Mar. 19		4·08	13·36	
			May 4	3	3·96	13·24	
			1848. May 3	4	6·96	13·15	11.43.13·25
129	4010	.....	1848. Mar. 29		12·13		
			May 3	3	11·82		11.44.18·85
130	4036	.....	1848. Mar. 29		54·87		11.49. 1·26
131	4072	o Virginis	1848. Mar. 29		27·89		11.57.34·04
132	4101	3 Corvi	1846. May 11		8·56	20·88	
			14		8·56	20·88	
			1847. May 4		11·65	20·89	
			1848. May 3		14·71	20·87	12. 3.20·88
133	4108	68 Ursæ Majoris	1847. April 23	4	5·53		12. 4.14·62
134	4122	.....	1847. May 4	4	48·22		12. 7.57·03
135	4123	δ Ursæ Majoris	1848. April 23		49·44		12. 7.58·49
136	4127	7 Comæ	1848. Mar. 29		38·76		
			May 3		38·62		12. 8.44·78
137	4140	14 Virginis	1846. May 11		24·97	37·29	
			May 14		24·89	37·21	
			1848. Mar. 29		30·97	37·13	12.11.37·21
138	4145	η Virginis	1848. May 13	7	7·85		12.12.13·99
139	4153	.....	1848. Mar. 29	3	40·65		
			May 3		40·72		12.12.46·75
140	4159	70 Ursæ Majoris	1847. April 23		24·36		12.13.33·18
141	4180	5 Can. Venat.	1847. April 23		34·00		12.16.42·83

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	"	"	° ′ ″	
1847. Mar. 30	18·7	19·4		Proper motion in R.A. = + 0ˢ·53 in
1848. May 13	44·3	24·8	87.23.22·1	N.P.D. = + 0″·28.
1846. April 28	58·8	18·8		
1847. Mar. 19	17·7	17·7		May 3, hurried.
May 4	13·1	13·1	76.53.16·5	
				Proper motion in R.A. = + 0ˢ·344.
1846. May 11	37·2	57·4		
14	43·4	63·6		
1847. May 4	57·8	58·0	112.45.59·7	
1847. May 4	52·6		18.57.52·7	
1846. May 11	30·3			
14	33·3		98. 4.51·7	
1848. May 13	18·5		89.49.58·6	

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					s.	s.	h. m. s.
142	4185	71 Ursæ Majoris	1848. Mar. 29		45·65		12.17.51·46
143	4199	.....	1848. Mar. 29		1·73		
			May 3	4	1·73		12.20. 7·75
144	4205	.....	1846. May 15		56·36	8·39	
			1847. May 4		59·25	8·27	
			1848. Mar. 29		2·17	8·19	12.21. 8·28
145	4207	17 Comæ	1848. May 3		18·78		12.21.24·80
146	4231	.....	1848. Mar. 29		57·45		
			May 3		57·39		12.26. 3·42
147	4244	.....	1848. Mar. 29		44·81		12.27.50·70
148	4268	γ Virginis	1846. May 8		51·42	3·59	
			11		51·47	3·64	
			June 3	4	51·56	3·73	
			1847. May 4	3	54·50	3·63	
			25		54·65	3·78	
			1848. May 3		57·60	3·69	
			13		57·50	3·59	12.34. 3·66
149	4277	.....	1847. May 4		46·70	55·92	
			1848. Mar. 29		49·79	55·94	
			May 3	5	49·66	55·81	12.35.55·89
150	4311	.....	1846. May 15		51·17	2·66	
			1848. Mar. 29		56·60	2·35	12.43. 2·50
151	....	.....	1848. Mar. 29		33·61		12.45.39·63
152	4329	41 Virginis	1846. May 8	2	6·43		
			11		6·29		
			14	4	6·26		
			15	3	6·23		12.46.18·33
153	4340	δ Virginis	1847. May 25		53·81		12.48. 2·89
154	4364	.....	1848. Mar. 29	2	8·39		
			May 3		8·48		12.54.14·32
155	4366	78 Ursæ Majoris	1846. April 21	3	6·59		
			May 11	3	6·16		
			14	2	6·60		
			15	4	6·35		12.54.16·76

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	"	"	° ′ ″	
1846. May 15	13·2	33·1		
1847. May 4	29·6	29·5	62.56.31·3	
				Largest of a cluster.
1846. May 11	13·3	32·7		Proper motion in R.A. = — 0·ˢ033
June 3	7·8	27·2		in N.P.D. = + 0·″02.
1847. May 25	30·4	29·9		
1848. May 13	53·7	33·4	90.37.30·8	
1847. May 4	2·8		90.44. 2·2	
1846. May 15	38·0		51.39.56·8	
			76.46 ...	Precedes the next, in the same field.
1846. April 28	31·2			
May 8	28·1			May 11, hurried observation.
11	34·0			
15	27·8		76.45.48·9	
1847. May 25	8·9		85.47. 8·0	Proper motion in R.A. = — 0·ˢ027
				in N.P.D. = + 0·″09.
1846. April 21	7·1			
May 11	13·7			
14	11·8			
15	10·3		32.49.28·7	

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					s.	s.	h. m. s.
156	4391	49 Virginis	1848. May 13		56·27		13. 0. 2·53
157	4394	.....	1846. April 28		31·09		
			May 11		31·06		
			14	4	31·17		13. 0.43·59
158	4401	θ Virginis	1846. May 8		59·05		13. 2.11·45
159	4433	.....	1846. April 21	3	43·66		
			May 15		43·64		13. 6.54·60
160	4445	.....	1846. May 11		41·47		
			14	2	41·39		13. 9.53·94
161	4449	61 Virginis	1847. May 25		24·80		
			26		24·57		13.10.34·00
162	4457	.....	1846. April 21		58·58		
			May 15		58·98		13.12. 9·86
163	4513	.....	1846. May 11	3	34·07		13.23.45·46
164	4526	.....	1846. May 14		30·43		13.25.41·80
165	4532	ζ Virginis	1847. April 28		54·06		
			29		53·98		13.27. 3·23
166	4559	.....	1846. May 14		59·30		
			15	4	59·14		
			29	4	59·10		13·32.11·04
167	4565	82 Virginis	1846. May 8		31·94	44·52	
			1847. April 28		35·15	44·58	13.33.44·55
168	4605	84 Ursæ Majoris	1846. May 29		50·54		13.40.59·55
169	4691	.....	1846. May 29		51·01		13.59. 4·03
170	4700	.....	1846. May 29	4	26·28		14. 2.39·32
171	4713	.....	1846. May 25	3	28·33		14. 4.40·46
172	4716	κ Virginis	1847. May 26		44·53		14. 4.54·09
173	4743	λ Virginis	1847. May 26	3	50·41		
			27	4	50·33		14.11. 0·07
174	4822	5 Ursæ Minoris	1846. May 29		55·24		14.27.54·26

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	"	"	° ′ ″	
1848. May 13	35·7		99.56.14·4	
1846. April 28	27·1			
May 11	32·3			
14	32·4			
15	25·2		98.10.46·7	
1846. April 28	49·5			
May 15	50·1		49. 3. 6·6	
1846. May 14	57·7		97.56.14·2	
1847. May 25	27·2			Proper motion in R.A. = $-0^{s}\cdot069$
26	28·1		107.28.27·6	in N.P.D. = $+1''\cdot03$.
1846. May 15	41·3		54. 4.57·6	
1846. May 11	0·3		64.59.15·2	
1846. May 14	9·1		64.52.23·8	
1847. April 28	43·1			
29	39·9		89.49.37·4	
1846. May 14	12·7			
15	9·7		78.29.25·0	
1846. May 8	23·6	37·2		
1847. April 28	45·1	40·3	97.56.38·7	
1847. May 26	31·1		99.34.22·6	
1847. May 26	47·8			
27	48·4		102·40.38·7	

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					s.	s.	h. m. s.
175	....	.....	1846. May 29	2	31·61		14.29.30·63
176	4894	8 Libræ	1846. May 21	4	10·84	24·08	
			June 6		10·81	24·05	
			1847. May 25	4	13·90	23·83	14.42.23·99
177	....	.....	1848. May 9		38·00		
			10	7	37·74		
			13	5	37·91		14.44.44·39
178	4943	40 Bootis	1846. June 13		42·49		14.53.51·80
179	4980	47 Bootis	1846. June 13	3	19·73		15. 0.27·69
180	5036	δ Bootis	1847. June 21	4	20·08		15. 9.27·31
181	5079	11 Ursæ Minoris	1846. June 13	4	14·95		15.17.14·47
182	5084	μ Bootis	1847. June 21		42·56		
			23		42·52		15.18.49·37
183	5091	.....	1846. June 1		4·94		15.20. 8·86
184	5094	γ Ursæ Minoris	1846. June 13	4	0·57		15.20.59·91
185	5098	β Coronæ Bor.	1847. May 28		31·29		15.21.38·75
186	5178	ζ Coronæ Bor.	1847. June 23		37·06		15.33.43·83
187	....	.....	1846. June 1	2	54·94		15.43. 0·69
188	5248	.....	1846. June 1		55·05		15.44. 0·80
189	5257	θ Libræ	1847. June 23		7·26		
			25		7·28		15.45.17·46
190	5303	δ Scorpii	1847. May 28		17·72		
			29		17·73		
			June 25		17·64		15.51.28·30
191	5322	π Serpentis	1847. June 21		42·56		
			23	3	42·63		
			July 7	4	42·51		15.55.50·31
192	5335	.....	1846. Jnne 24	4	55·81		15.57.10·06
193	5382	ν Scorpii	1847. June 21		6·72		16· 3.17·14

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	″	″	° ′ ″	Companion of 5 Urs. Min.
1848. May 9	54·5			May 9, not good; faint.
13	56·8		102. 1.25·9	
1847. June 21	41·8		56. 7.22·5	
1847. June 21	0·4			
23	2·7		52. 5.40·5	
1846. June 1	26·4		26· 7.17·9	
1847. May 28	54·1		60·22.32·4	
1847. June 23	52·0		52.52.27·9	The following star.
			34.10. . . .	
1846. June 1	57·3		34. 9.42·1	
1847. June 23	35·1			
25	32·4		106.17. 7·1	
1847. May 28	53·6			June 25, intervals irregular.
June 25	53·2		112.11.25·4	
1847. June 21	3·8			
23	4·0		66.46.34·9	
1847. June 21	27·0		109. 3.56·3	

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					s.	s.	h. m. s.
194	5415	.....	1846. June 1		2·25		16. 6. 6·94
195	5447	σ Scorpii	1847. June 25		53·91		16.12. 4·81
196	5452	.....	1848. July 6		28·78		16.13.33·98
197	5462	19 Ursæ Minoris	1846. June 16	2	16·88		16.15. 9·55
198	5466	γ Herculis	1847. June 21		10·29		16.15.18·23
199	5552	σ Herculis	1847. June 21	4	10·23		16.29.16·02
200	5591	14 Ophiuchi	1846. July 10		54·56		
			17		54·60		16.34. 6·74
201	5592	.....	1846. June 16		25·27		16.34.11·27
202	5597	.....	1848. July 6		42·59		
			8		42·58		16.34.47·56
203	5604	ζ Herculis	1847. June 21		31·13		
			July 7		31·16		16.35.38·03
204	5615	.....	1848. July 6	3	39·24		
			8	3	39·27		16.37.43·52
205	5617	η Herculis	1847. July 7	4	39·27		
			12		39·33		16.37.45·45
206	5647	.....	1848. July 6		33·82		
			8		33·83		16.42.39·36
207	5692	ι Ophiuchi	1847. July 7		46·37		16.46.54·88
208	5702	54 Herculis	1846. July 10		36·03		
			17		36·17		16.48.46·66
209	5731	ε Herculis	1847. July 12		26·33		16.54.33·21
210	5732	.....	1846. July 10		33·02	43·91	
			17	4	32·98	43·87	
			1848. July 6	4	38·56	44·01	16.54.43·93
211	5753	.....	1848. July 17	4	40·32		16.56.45·83
212	5757	.....	1846. July 10	2	53·01	4·03	
			1848. July 17		58·40	3·91	16.57. 3·97

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OBSERVATIONS OF NORTH POLAR DISTANCE.

Date of Observation.	Seconds of N.P.D. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean N.P.D., Jan. 1, 1850.	
	"	"	° ′ ″	
1846. June 1	34·3		31.40.12·4	
1847. June 25	12·3		115·13.39·6	
1848. July 6	47·9		68.30. 5·9	
1847. June 21	0·8		70.29.27·3	
1847. June 21	40·3		47.15. 3·5	
1846. July 10	8·6			
17	8·9		88.31.38·3	
1846. June 16	48·8		10.43.18·1	
1848. July 6	38·5			
8	39·8		64.50.53·7	
1847. June 21	59·6		58. 7.21·3	
1848. July 6	9·9			
8	9·6		53.12.23·8	
1848. July 6	8·3		76.28.21·6	
1846. July 10	60·3			
17	59·1		41.19.24·2	
1846. July 10	14·9	37·5		
17	14·5	37·1		
1848. July 6	29·1	40·4	74.49.38·3	
1846. July 10	24·5	46·3		
1848. July 17	33·1	44·0	76.12.45·2	

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OBSERVATIONS OF RIGHT ASCENSION.

Number for Reference.	No. in British Association Catalogue.	Name of Star.	Date of Observation.	No. of Wires.	Seconds of Mean R.A. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean R.A., Jan. 1, 1850.
					s.	s.	h. m. s.
213	5777	.....	1848. July 6		14·86		17. 1.19·15
214	5781	η Ophiuchi	1847. July 7		36·41	46·70	
			12		36·18	46·47	
			23		36·33	46·62	
			1848. July 13	6	39·76	46·62	17. 1.46·60
215	5785	μ Draconis	1846. July 10	4	8·63		
			17		8·32		17. 2.13·45
216	5842	68 Herculis	1847. July 7		40·58		17.11.47·22
217	5860	70 Herculis	1846. July 17		33·40		17.14.43·28
218	5886	ϱ Herculis	1846. July 10		22·16		
			17	3	22·15		
			Aug. 15		22·13		17.18.30·43
219	5886	ϱ Herculis	1847. July 7		24·38		
			30		24·48		17.18.30·64
220	....	.....	1848. July 17	6	19·09		17.18.24·87
221	5894	.....	1848. July 6		58·82		
			17		58·83		17.19. 4·61
222	5917	.....	1846. June 1		42·14		
			Aug. 15		42·48		17.23.45·38
223	5922	λ Herculis	1847. July 7		33·47		
			12		33·47		
			30		33·51		17.24.40·74
224	5976	o Serpentis	1847. July 7		49·12		
			30		49·16		17.32.59·26
225	5987	58 Ophiuchi	1846. July 7		12·34		17.34.26·73
226	5988	.....	1848. July 6		50·68		
			17	6	50·84		17.34.55·68
227	5990	ι Herculis	1846. July 10		6·95		
			17		6·87		17.35.13·67
228	5996	β Ophiuchi	1847. July 7		54·90		
			30		54·99		17.36. 3·83

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OBSERVATIONS OF NORTH POLAR DISTANCE.

Date of Observation.	Seconds of N.P.D. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean N.P.D. Jan. 1, 1850.	
	"	"	° ′ ″	
1847. July 23	46·1	1·2		
1848. July 13	54·8	4·9	105.32. 3·0	
1846. July 10	30·7			
17	26·4		35.19.48·6	
1846. July 17	30·6		65.20.46·4	
1846. July 10	36·4			The space between the two stars was observed; July 17, bad, hurried.
17	32·4			
Aug. 15	34·9		52.42.49·0	
				Larger and following star: July 30, intervals irregular.
			82.16	
1848. July 6	63·9			
17	59·4		82.16. 8·8	
1846. June 1	17·8			
Aug. 15	12·6		29.49.30·4	
1848. July 6	29·7			
17	27·0		65.24.32·7	
1846. July 10	31·8			
17	29·7		43.54.39·4	

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OBSERVATIONS OF RIGHT ASCENSION.

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					s.	s.	h. m. s.
229	6020	γ Ophiuchi	1847. July 7		13·35		
			30		13·39		17.40.22·39
230	6035	.....	1848. July 17		57·88		17.43. 3·56
231	6047	ψ^1 Draconis	1846. July 10		41·35		
			17	4	40·45		
			Aug. 15	4	41·21		17.44.36·64
232	6082	θ Herculis	1847. July 7		0·31		
			30		0·45		17.51. 6·54
233	6123	70 Ophiuchi	1847. July 7		43·36		
			29	4	43·20		
			30		43·30		17.57.52·36
234	6137	.....	1848. July 6		42·48		17.59.48·51
235	....	.....	1846. Aug. 15		21·91		18. 0.33·96
236	6150	o Herculis	1847. July 7		34·50		
			29		34·52		
			30	1	34·59		18. 1.41·54
237	6185	.....	1848. July 24	5	24·89		
			26		24·46		18. 7.27·10
238	6201	.....	1848. July 17	5	47·72		18. 9.54·76
239	6213	.....	1846. Aug. 15	4	42·87		
			19		42·92		18.11.54·50
240	....	.....	1848. July 17	4	16·36		
			20	7	16·31		
			24	6	16·46		18.16.21·72
241	6280	.....	1846. Aug. 19	3	27·73		18.20.39·41
242	6420	8 Aquilæ	1848. July 20	7	23·06		18.43.29·36
243	6447	.....	1848. July 17	7	45·55		18.46.52·47
244	6460	θ^1 Serpentis	1846. June 30		33·78	45·70	
			1847. July 7	2	36·87	45·81	18.48.45·76
245	....	θ^2 Serpentis	1846. June 30	3	35·30	47·22	
			1847. July 7		38·32	47·26	18.48.47·24

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OBSERVATIONS OF NORTH POLAR DISTANCE.

Date of Observation.	Seconds of N.P.D. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean N.P.D., Jan. 1, 1850.	
	″	″	° ′ ″	
1848. July 17	1·8		80. 6. 4·8	
1846. July 10	42·9			
17	39·3			
Aug. 15	38.8		17.46.45·7	
				July 7, intervals irregular.
				July 7, not good.
				Proper motion in R.A. = + 0ˢ·017.
1848. July 6	54·0		87.31.54·0	
1846. Aug. 15	45·8		87·47.45·4	
1848. July 24	24·8			
36	26·0		35.45.24·1	
1848. July 17	19·7		108.40.18·0	
1846. Aug. 19	57·1	52·9		Aug. 15, bad illumination.
1848. July 20	56·7	54·6	82.47.53·7	
1848. July 17	60·7			
20	62·7			S. F. of two.
24	59·2		73·22.58·1	
1846. Aug. 19	48·5		83.53.41·3	One of a cluster.
1848. July 20	28·9		93.29.21·1	
1848. July 17	23·0			
20	24·4		106.33.15·5	

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OBSERVATIONS OF RIGHT ASCENSION.

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					s.	s.	h. m. s.
246	6480	.....	1848. July 8	7	19·65		
			20		19·64		18.51.24·11
247	....	.....	1848. July 8	2	53·33		18.51.57·80
248	6491	γ Lyræ	1846. June 30		10·83	19·80	
			Aug. 19		11·20	20·17	
			1847. July 7		13·18	19·91	18.53.19·96
249	6507	o Sagittarii	1848. July 15	7	34·23		18.55.41·42
250	6519	.....	1848. July 17	7	58·60		18.57. 5·48
251	6564	20 Aquilæ	1846. Aug. 19		19·60	32·62	
			1847. Aug. 19		22·58	32·35	19. 4.32·48
252	6583	53 Draconis	1846. Aug. 19	4	45·50		19. 8.50·03
253	6584	43 Sagittarii	1846. Sept. 28		37·18		19. 8.51·24
254	6619	ρ^1 Sagittarii	1846. Sept. 28	1	44·02		19.12.57·96
255	6623	$\varkappa$ Cygni	1846. Aug. 19		32·49	38·02	
			1847. Aug. 19	3	33·81	37·96	
			26	4	33·78	37·93	19.13.37·97
256	6674	α Vulpeculæ	1847. Aug. 19		20·31		19.22.27·82
257	6676	8 Vulpeculæ	1847. Aug. 19		33·81		19.22.41·32
258	6690	β^1 Cygni	1846. July 28	2	30·56	40·23	
			Aug. 19	3	30·71	40·38	
			1847. Sept. 26	3	33·08	40·33	19.24.40·31
259	....	ξ^2 Cygni	1846. July 28	3	32·63	42·30	
			Aug. 19	3	32·94	42·61	19.24.42·46
260	6706	52 Sagittarii	1847. Aug. 26		23·41		19.27.34·38
261	6713	$\varkappa$ Aquilæ	1847. Sept. 23	3	39·60		19.28.49·29
262	6730	.....	1847. Aug. 24		49·57		19.31.54·40
263	6733	54 Sagittarii	1848. July 15	7	0·61		19.32. 7·49
264	6734	θ Cygni	1847. Aug. 19		20·17		
			24	2	19·89		
			Sept. 23		20·24		19.32.24·94

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OBSERVATIONS OF NORTH POLAR DISTANCE.

Date of Observation.	Seconds of N.P.D. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean N.P.D., Jan. 1, 1850.	
	"	"	° ′ ″	
1848. July 8	27·0			
20	27·4		57.17.18·3	
			57.11	
1846. Aug. 19	7·7		57.30.49·2	
1848. July 17	4·5		105·52.54·6	
1846. Aug. 19	33·1		98.11.10·8	
1846. Aug. 19	10·1		33.23.46·4	
1846. Sept. 28	15·1		109.12.51·3	
1846. Aug. 19	51·2		36.54.25·9	
1846. Aug. 19	39·0		62.21.10·0	

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OBSERVATIONS OF RIGHT ASCENSION.

Number for Reference.	No. in British Association Catalogue.	Name of Star.	Date of Observation.	No. of Wires.	Seconds of Mean R.A. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean R.A., Jan. 1, 1850.
					s.	s.	h. m. s.
265	6739	α Sagittæ	1846. Aug. 19		12·79		19.33.23·51
266	6870	62 Sagittarii	1847. Aug. 19	4	14·51		19.53.25·61
267	6972	α^1 Capricorni	1847. Oct. 18	2	9·76		20. 9.19·75
268	7067	41 Cygni	1846. Sept. 14		6·30		
			18		6·41		20.23.16·15
269	7149	α Delphini	1846. Oct. 1		29·20		20.32.40·32
270	7156	73 Draconis	1846. Aug. 10	4	27·89		
			Sept. 18	2	28·93		20.33.25·63
271	7239	μ Aquarii	1846. Oct. 27	3	20·49		20.44.33·45
272	7268	.....	1846. Aug. 10		37·25		
			Sept. 18	1	(37·80)		20.50.45·33
273	7337	61^2 Cygni	1846. Sept. 18	2	1·41		21. 0.11·89
274	7344	ν Aquarii	1846. Sept. 28		11·96		
			Oct. 1		11·93		21. 1.25·02
275	7374	29 Capricorni	1846. Sept. 21		13·13		
			Oct. 3		13·08		21. 7.26·42
276	7407	ι Capricorni	1846. Sept. 21		39·97		
			Oct. 1		39·80		21.13.53·29
277	7427	18 Aquarii	1846. Sept. 28	4	46·16		21.15.59·28
278	7525	γ Capricorni	1846. Sept. 18		33·04	46·38	
			21		33·05	46·39	
			Oct. 3	3	32·94	46·28	
			1847. Sept. 16		36·42	46·42	21.31.46·36
279	7580	δ Capricorni	1846. Sept. 18		32·09	45·37	
			21		32·08	45·36	
			Oct. 3		32·04	45·32	
			1847. Sept. 16		35·41	45·35	21.38.45·35
280	7618	μ Capricorni	1846. Sept. 18		53·64	6·77	
			21		53·66	6·79	
			1847. Aug. 9	4	57·01	6·85	
			Sept. 16		57·11	6·95	21.45. 6·84
281	7648	.....	1846. Oct. 10		5·97		21.50.18·93

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OBSERVATIONS OF NORTH POLAR DISTANCE.

Date of Observation.	Seconds of N.P.D. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean N.P.D. Jan. 1, 1850.	
	s	s	° ′ ″	
1846. Aug. 19	14·5		72.19.42·7	
1846. Oct. 1	40·3		74.36.50·7	
1846. Aug. 10	30·9			
Sept. 18	30·4		15.38.40·7	
1846. Aug. 10	14·1			The largest star in the field, apparently, not the same as that in Catalogue.
Sept. 18	16·3		43. 9.21·0	Proper motion in R.A. = + 0ˢ·352.
1846. Sept. 28	35·3			
Oct. 1	31·9		101.58.36·5	
1846. Sept. 21	28·9			
Oct. 3	31·3		105.47.31·6	
1846. Sept. 21	13·6			
Oct. 1	11·5		107.28.12·5	
1846. Sept. 18	15·9	11·9		Proper motion in R.A. = + 0ˢ·019.
21	14·7	10·7		
1847. Sept. 16	59·1	11·1	107.20.11·2	
1846. Sept. 18	22·0	17·3		Proper motion in R.A. = + 0ˢ·019
21	20·4	15·7		in N.P.D. = + 0″·25.
Oct. 1	26·2	21·5		
1847. Sept. 16	7·0	18·4	106.48.18·3	
1846. Sept. 18	26·3	19·5		Proper motion in R.A. = + 0ˢ·026
21	22·8	16·0		in N.P.D. = — 0″·04.
1847. Sept. 16	7·5	17·4	104.15.17·6	
1846. Oct. 10	46·0		103.22.38·3	Hurried.

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OBSERVATIONS OF RIGHT ASCENSION.

Number for Reference.	No. in British Association Catalogue.	Name of Star.	Date of Observation.	No. of Wires.	Seconds of Mean R.A. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean R.A., Jan. 1, 1850.
					s.	s.	h. m. s.
282	7691	ι Aquarii	1847. Sept. 22		10·14		21.58.19·88
283	7722	38 Aquarii	1847. Aug. 7	4	26·54		
			9	2	26·46		
			13		26·48		
			19	4	26·47		
			Sept. 2		26·57		
			3		26·43		
			4		26·43		22. 2.36·12
284	7731	π^2 Pegasi	1846. Sept. 18		9·14		22. 3.19·76
285	7747	40 Aquarii	1847. Sept. 20		15·31		
			Oct. 8		15·31		
			18		15·26		
			27		15·27		22. 5.24·93
286	7771	42 Aquarii	1846. Sept. 25		32·82		22. 8.45·70
287	7773	θ Aquarii	1846. Oct. 29		42·19	54·85	
			1847. Sept. 22		45·39	54·88	22. 8.54·87
288	7795	γ Aquarii	1846. Sept. 16	3	41·95		
			Oct. 1	4	41·91		
			2		41·95		22.13.54·31
289	7806	50 Aquarii	1846. Sept. 25		11·70		
			Oct. 3		11·92		22.16.24·69
290	7945	λ Pegasi	1846. Sept. 16		6·94		22.39.18·45
291	7970	λ Aquarii	1846. Oct. 29		34·67	47·21	
			30		34·64	47·18	
			1847. Oct. 11		37·80	47·20	22.44.47·20
292	8085	φ Aquarii	1846. Oct. 29		20·60		
			30		20·53		23. 6.33·00
293	8105	γ Piscium	1846. Sept. 16	3	11·02	23·42	
			1847. Oct. 21		14·09	23·38	23. 9.23·40
294	8160	υ Pegasi	1846. Sept. 16	3	41·71		
			Oct. 26		41·70		23.17.53·58
295	8243	λ Piscium	1847. Oct. 21	4	14·34		23.34.23·54
296	8268	τ Cassiopeæ	1846. Sept. 16	3	32·85		23.39.44·38
297	8331	ω Piscium	1846. Oct. 30		24·32		23.51.36·58
298	8368	33 Piscium	1848. Jan. 11		33·07		23.57.39·21

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OBSERVATIONS OF NORTH POLAR DISTANCE.

Date of Observation.	Seconds of N.P.D. reduced to Jan. 1 preceding.	Seconds reduced to Jan. 1, 1850.	Mean N.P.D., Jan. 1, 1850.	
	″	″	° ′ ″	
1847. Sept. 22	34·0		104.35.42·1	
1847. Aug. 7	53.8			
13	53·4			
19	53·7			
Sept. 3	52·3			
4	53·5		102.18. 0·9	Sept. 4, hurried.
1846. Sept. 18	25·9		57.33.24·1	
1847. Oct. 8	45·4			
27	50·1		102.39.54·9	
1846. Sept. 25	46·6		103.34.35·6	
1846. Oct. 29	53·4	42·4		
1847. Sept. 22	37·6	44·3	98.31.43·4	
1846. Sept. 16	40·7			
Oct. 1	43·6			
2	41·0		92. 8.30·0	
1846. Sept. 25	27·2			
Oct. 3	32·2		104·17.17·5	
1846. Sept. 16	36·9		67·13.21·6	
1846. Oct. 29	50·8		98.22.34·8	
1846. Oct. 29	41·9			
30	39·2		96.51.22·5	
1846. Sept. 16	29·3	10·9		Proper motion in R.A. = + 0ˢ·052
1847. Oct. 21	10·6	11·8	87.32.11·3	in N.P.D. = — 0·″04.
1846. Sept. 16	38·8			
Oct. 26	34·1		67.25.17·6	
1847. Oct. 21	44·4		89. 2.44·6	
1846. Sept. 16	23·3		32.11. 3·4	
1846. Oct. 30	22·1		83.58. 1·9	
1848. Jan. 11	26·1		96·32.46·0	

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OBSERVATORY, DURHAM.

OBSERVED RIGHT ASCENSIONS OF THE MOON'S LIMBS;

AND

RIGHT ASCENSIONS OF MOON CULMINATING STARS,

AT THE TIMES OF OBSERVATION.

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1846. Day.	Object.	No. of Wires.	Observed A.R. h. m. s.	1846. Day.	Object.	No. of Wires.	Observed A.R. h. m. s.
Jan. 1	Moon I		22.11.11·35	March 11	Regulus		10. 0.12·54
8	Moon I		4.24.40·41		Moon I		10.31.39·50
	y^2 Orionis		5. 0.55·41	12 ‡	d Leonis		10.52.39·09
9	ι Tauri		4.53.55·87		σ Leonis		11.13.14·41
	y^2 Orionis		5. 0.55·31		Moon I		11.19. 9·48
	Moon I		5.17.46·07	§	Moon II		11.21.13·42
Feb. 4	η Tauri		3.38.21·98		ν Leonis	4	11.29. 6·73
	Moon I		4. 7.35·33		β Virginis		11.42.43·38
*	δ^3 Tauri		4.16.36·84	May 8	γ^1 Virginis		12.33.54·04
	α Tauri		4.27. 7·19		θ Virginis		13. 2. 1·83
5	δ^3 Tauri		4.16.36·67		Moon I		13. 7. 2·69
*	α Tauri		4.27. 6·58		α Virginis		13.17. 8·08
	Moon I		5. 0.45·95		μ Virginis		13.33.34·86
	o Tauri		5.18.25·34	11	α Virginis	4	13.17. 8·15
	ζ Tauri		5.28.28·71		α^2 Libræ		14.43.25·55
6	o Tauri	4	5.18.25·43		Moon II		15.57.44·19
	ζ Tauri	4	5.28.28·68	June 3	Moon I		11.55.13·57
	Moon I		5.53.24·54		γ^1 Virginis	4	12.33.53·99
	μ Geminorum		6.13.41·01	5	α Virginis		13.17. 8·21
7	γ Geminorum		6.28.51·08		Moon I		13.35.19·45
	Moon I		6.45.10·00	6	Moon I		14.29.39·02
	ζ Geminorum	3	6.55. 0·63		α^2 Libræ		14.42.25·53
	δ Geminorum		7.10.57·88		β Libræ		15. 8.47·00
10	δ Cancri	4	8.35.58·18	July 3	Moon I		14. 4.35·98
	α^2 Cancri		8.50. 5·99	4	Moon I		14.59.34·24
*	Moon I		9.13.28·99	7	D Ophiuchi		17.34.16·31
†	Moon II		9.15.33·10		Moon I		18. 4.35·36
	π Leonis		9.52. 6·70	Aug. 3	Moon I		17.32.20·15
March 4	α Tauri	4	4.27. 6·50		μ^1 Sagittarii		18. 4.37·13
	Moon I		4.41. 9·53	Sept. 28	Moon I		18.45.23·28
	ι Tauri	3	4.53.55·29		d Sagittarii		19. 8.40·57
	β Tauri		5.16.35·41		ρ^1 Sagittarii	1	19.12.47·41
5	ι Tauri		4.53.55·19	Oct. 1	ν Aquarii		21. 1.15·59
	β Tauri	3	5.16.35·41		β Aquarii		21.23.30·42
	Moon I		5·34.38·01		Moon I		21.45.48·74
	ν Orionis		5.58.48·52		γ Aquarii	4	22.13.45·73
	μ Geminorum		6.13.40·53	3	Moon I	3	23.43.40·59
7	ξ^2 Geminorum		6.36.40·78	27	Moon I		20.25.28·39
	Moon I		7.18. 4·86		μ Aquarii	3	20.44.23·65
	1 Cancri		7.48.16·68	29	θ Aquarii		22. 8.45·69
9	δ Cancri		8.35.57·99		Moon I		22.20.52·68
	α^2 Cancri	2	8.50. 6·14		λ Aquarii		22.44.38·32
*	Moon I		8.56.29·29		ϕ Aquarii		23. 6.24·33
	ξ Leonis		9.23.40·83	30	λ Aquarii		22.44.38·28

* Intervals irregular.

† Correction applied for defect of illumination = + $0^s{\cdot}29$.

‡ March 12, the clock errors are discordant.

§ Correction applied for defect of illumination = + $0^s{\cdot}06$.

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OBSERVATIONS OF THE MOON.

1846. Day.	Object.	No. of Wires.	Observed A.R. h. m. s.	1847. Day.	Object.	No. of Wires.	Observed A.R. h. m. s.
Oct. 30	ϕ Aquarii		23. 6.24·24	May 25	δ Virginis		12.47.56·10
	Moon I		23.17.45·99		Moon I		12.54.39·14
	ι Piscium		23.32. 5·68		61 Virginis		13.10.27·44
	ω Piscium		23.56.28·19		α Virginis		13.17.10·95
Nov. 27	Moon I		23.54.31.15	26	61 Virginis		13.10.27·21
Dec. 2 *	γ Tauri		5.11. 7·12		α Virginis		13.17.10·93
	α Tauri		4.27.10·44		Moon I		13.42.53·66
	Moon II		4.41.28·99		κ Virginis		14. 4.47·25
29	Moon I		4.17.14·57		λ Virginis	3	14.10.53·21
	α Tauri	3	4.27.10·59	27	λ Virginis	4	14.10.53·13
Oct. 2	γ Aquarii		22.13.45·77		Moon I		14.33. 3·08
	Moon I	4	22.44.57·03		β Libræ		15. 8.49·69
1847.				28	α^2 Libræ		14.42.28·29
Jan. 28	μ Geminorum		6.13.44·36		β Libræ		15. 8.49·70
	γ Geminorum		6.28.54·19		Moon I		16.25.31·01
	Moon I		6.46. 1·10		δ Scorpii		15.51.20·99
	δ Geminorum		7.11. 1·12		β^1 Scorpii		15.56.36·04
29	δ Geminorum	4	7.11. 1·03	29	δ Scorpii		15.51.21·01
	k Geminorum		7.24.54·42		β^1 Scorpii		15.56.36·08
	Moon I		7.38.53·72	§	Moon I		16.20.22·27
Feb. 22	Moon I		4.38.43·04		Moon II		16.22.36·97
24	η Geminorum		6. 5.40·27	June 21	Moon I	3	12.35.44·94
	μ Geminorum	2	6.13.44·12	23	Moon I		14.11.57·21
	Moon I		6.29.20·18		α^2 Libræ		14.42.28·27
	ζ Geminorum	2	6.55. 3·97		β Libræ		15. 8.49·66
	δ Geminorum		7.11. 0·89	25	θ Libræ		15.45.10·46
25	ζ Geminorum		6.55. 3·92		δ Scorpii		15.51.21·00
	δ Geminorum		7.11. 0·97		Moon I		15.56.50·31
	Moon I		7.22.21·34		σ Scorpii		16.11.57·43
March 29	Moon I		11. 9. 6·14		α Scorpii		16.20. 5·59
	τ Leonis		11.20. 6·40	July 23	Moon I		16.27.18·73
	β Virginis	4	11.42.45·84		η Ophiuchi		17. 1.39·65
31†	Moon I	4	12.42. 9·61	Oct. 21	γ Piscium		23. 9.17·64
	Moon II		12.44.12·18		λ Piscium		23.34.17·90
April 27	Moon I	2	12.25.34·06		Moon I		23.52.27·60
28	Moon I		13.13. 1·90	23	μ Piscium		1.22.14.19
	ζ Virginis		13.26.56·52	||	Moon I		1.53.37·50
	m Virginis		13.33.37·75		Moon II		1.55.59·01
29	ζ Virginis		13.26.56·43	Nov. 13	Moon I		19.42.22·77
	Moon I		14. 1.57·94		α^2 Capricorni		20. 9.36·05
30 ‡	α^2 Libræ	1	14.42.28·45	19	Moon I		1.22.21·98
‡	Moon I	2	14.52.47·50	22	λ Tauri	2	3.52.16·65
‡	Moon II	1	14.54.55·83		α Tauri		4.27.13·30
May 25	γ^1 Virginis		12.33.56·84		Moon II		4.30.33·11

* Intervals irregular.

† Correction applied for defect of illumination = $-0^s\cdot01$; clock error from night preceding.

‡ Approximate.

§ No correction has been applied for defect of illumination.

|| Correction applied for defect of illumination = $-0^s\cdot01$.

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1847. Day.	Object.	No. of Wires.	Observed A.R. h. m. s.	1848. Day.	Object.	No. of Wires.	Observed A.R. h. m. s.
Dec. 20	Moon I	3	4.59.44·83	April 11	Moon I	7	8.29.11·58
					A^2 Cancri	7	8.38.36·85
1848.					a^3 Cancri	5	8.50.11·19
Jan. 11	Moon I		23.47.31·77	13	a Leonis	7	10. 0.17·76
	s Piscium		23.57.32·76		Moon I	7	10.11.42·64
	10 Ceti		0.18.49·62		ρ Leonis	7	10.24.49·80
Feb. 11	δ Arietis	4	3. 2.57·26		d Leonis	7	10.52.44·19
	Moon I	7	3.18. 7·46	14	d Leonis	7	10.52.44·16
	γ Tauri		4.11. 9·74		Moon I	7	11. 0. 3·98
15	Moon I†	7	7.13. 7·67		σ Leonis	7	11.13.19·45
	k Geminorum†	7	7.24.57·37		τ Leonis	7	11.20. 8·87
	κ Geminorum†	7	7.35.17·37	May 13	β Virginis	7	11.42.48·12
16	k Geminorum		7.24.57·26		η Virginis	7	12.12. 9·64
	κ Geminorum		7.35.17·64		Moon I	7	12.18.59.56
	Moon I		8. 9. 4·98		γ^1 Virginis	5	12.33.59·41
	δ Cancri		8.36. 4.16		g Virginis	6	12.59.58·42
17	a^3 Cancri †	6	8.50.11·79	July 13	η Ophiuchi	6	17. 1.42·72
	Moon I †	7	9. 2.55·13		Moon I	7	17.27.33·90
March 11	Moon I	7	4.58.12·65	15	o Sagittarii	7	18.55.37·48
15	θ Cancri †	7	8.22.56·72		Moon I	7	19.17.24·39
	Moon I †	7	8.45.39·75	*	Moon II	7	19.19.38·40
	ξ Leonis †	7	9.23.46·56				

* Correction applied for defect of illumination = + 0ˢ·29.

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OBSERVATORY, DURHAM.

OBSERVED HORIZONTAL DIAMETERS

OF THE

SUN, MOON, AND PLANETS;

RIGHT ASCENSIONS OF THE SUN,

AND

RIGHT ASCENSIONS AND NORTH POLAR DISTANCES

OF THE

MOON AND PLANETS,

COMPARED WITH THE NAUTICAL ALMANAC.

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THE SUN'S DIAMETER.

Sidereal Intervals occupied by its Transit compared with those of the Nautical Almanac.

1846.	Observed Duration of Transit.	Seconds of Nautical Almanac.	O — N.	1846.	Observed Duration of Transit.	Seconds of Nautical Almanac.	O — N.
	m. s.	s.	s.		m. s.	s.	s.
Jan. 1*	2.22·00	22·02	— 0·02	Oct. 23	2.11·88	11·80	+ 0·08
23*	18·38	18·42	— 0·04	26**	12·10	12·42	— 0·32
28‡	17·44	17·32	+ 0·12	27	12·52	12·64	— 0·12
Feb. 2	16·24	16·16	+ 0·08	28	12·92	12·86	+ 0·06
5	15·50	15·48	+ 0·02	30*	13·17	13·30	— 0·13
March 2*	10·63	10·56	+ 0·07	Nov. 2*	13·83	13·96	— 0·13
10**	9·40	9·58	— 0·18	7	15·14	15·14	0·00
14	9·08	9·24	— 0·16	Dec. 2‡	21·18	20·60	+ 0·58
25**	8·69	8·76	— 0·17	3‡	20·70	20·76	— 0·06
26	8·58	8·76	— 0·18	7	21·40	21·36	+ 0·04
April 28‡	11·20	11·48	— 0·28	11	21·86	21·84	+ 0·02
May 1**	11·72	11·94	— 0·22	12	21·85	21·94	— 0·09
5	12·54	12·58	— 0·04	14	22·06	22·12	— 0·06
6	12·70	12·74	— 0·04	18	22·60	22·34	+ 0·26
11**	13·69	13·56	+ 0·13	29	22·21	22·26	— 0·05
15*	14·22	14·22	+ 0·00	30	22·25	22·20	+ 0·05
16‡	14·59	14·38	+ 0·21				
June 1	16·76	16·64	+ 0·12	1847.			
2	16·88	16·76	+ 0·12	Jan. 13	2.20.44	20·44	0·00
3*	17·00	16·86	+ 0·14	25	17·99	18·04	— 0·05
4	16·98	16·96	+ 0·02	26	17·81	17·82	— 0·01
5	17·00	17·06	— 0·06	29	17·10	17·14	— 0·04
6	17·34	17·16	+ 0·18	Feb. 3	16·04	16·00	+ 0·04
9	17·60	17·40	+ 0·20	6	15·40	15·30	+ 0·10
15	17·84	17·72	+ 0·12	8	14·80	14·84	— 0.04
18	17·83	17·78	+ 0·05	9	14·64	14·62	+ 0·02
24	17·44	17·74	— 0·30	10	14·30	14·38	— 0·08
29	17·54	17·56	— 0·02	11	14·10	14·16	— 0.06
July 14	16·14	16·08	+ 0·06	12	13·96	13·94	+ 0·02
20	15·09	15·20	— 0·11	13	13·64	13·72	— 0·08
22	14·94	14·88	+ 0·06	19	12·56	12·48	+ 0.08
25	14·36	14·40	— 0·04	25‡	11·62	11·38	+ 0·24
30	13·59	13.52	+ 0·07	March 10	9·65	9·62	+ 0·03
Aug. 3‡	13·02	12·84	+ 0·18	13	9·32	9·34	— 0·02
6	12·26	12·34	— 0·08	April 5**	8·90	9·00	— 0·10
11	11·48	11·48	0·00	6	9·03	9·06	— 0·03
19	10·16	10·24	— 0·08	8	9·13	9·18	— 0·05
Sept. 15	8·14	8·00	+ 0·14	9	9·32	9·26	+ 0·06
16	8·10	7·98	+ 0·12	10	9·32	9·32	0·00
19	7·90	7·98	— 0·08	17	9·88	10·00	— 0·12
24**	8·00	8·12	— 0·12	19	10·26	10·22	+ 0·04
25**	8·10	8·16	— 0·16	22**	10·85	10·60	+ 0·25
29	8·14	8·44	— 0·30	26	11·14	11·16	— 0·02
Oct. 2	8·58	8·68	— 0·10	May 1**	11·90	11·90	0·00
3	8·72	8·78	— 0·06	4	12·12	12·38	— 0·26
7	9·10	9·20	— 0·10	14	14·04	14·00	+ 0·04

* Imperfect. ‡ Noted as bad.

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OBSERVED HORIZONTAL DIAMETERS OF THE SUN, MOON, AND PLANETS.

Sidereal Intervals occupied by the Transit of the Sun's Diameter compared with those of the Nautical Almanac.

1847.	Observed Duration of Transit.	Seconds of Nautical Almanac.	O — N.	1848.	Observed Duration of Transit.	Seconds of Nautical Almanac.	O — N.
	m. s.	s.	s.		m. s.	s.	s.
May 15*‡	2.14·23	14·18	+ 0·05	Jan. 4*	2·21·78	21·78	0·00
26	15.86	15·86	0·00	6	21·43	21·54	— 0·11
June 1	16·62	16·62	0·00	8	21·22	21·28	— 0·06
2	16·68	16·74	— 0·06	11	20·76	20·84	— 0·08
3	17·00	16·84	+ 0·16	12	20·76	20·68	+ 0·08
12	17·52	17·56	— 0·04	Feb. 15	13·54	13·36	+ 0·18
24	17·58	17·76	— 0·18	18	12·80	12·74	+ 0·06
29	17·74	17·58	+ 0·16	23	11·79	11·80	— 0·01
30*	17·71	17·52	+ 0·19	28	10·99	10·94	+ 0·05
July 5	17·26	17·14	+ 0·12	March 10	9·57	9·54	+ 0·03
8*‡	16·57	16·84	— 0·27	14	9·20	9·20	0·00
9**	16·80	16·72	+ 0·08	22	9·08	8·80	+ 0·28
10*	16·63	16·60	+ 0·03	28	8·81	8·76	+ 0·05
12	16·64	16·48	+ 0·16	29*	8·68	8·78	— 0·10
14	16·30	16·10	+ 0·20	30	8·90	8·80	+ 0·10
15	16·12	15·96	+ 0·16	April 18	10·23	10·20	+ 0·03
29	13·78	13·76	+ 0·02	29*	11·78	11·70	+ 0·08
30	13·58	13·58	0·00	May 3	12·35	12·32	+ 0·03
31	13·45	13·40	+ 0·05	4	12·52	12·48	+ 0·04
Aug. 11	11·56	11·52	+ 0·04	5	12.67	12·64	+ 0·03
14	10·84	11·04	— 0·20	6	13·06	12·80	+ 0·26
Sept. 2**	8·75	8·64	+ 0·11	9	13·23	13·30	— 0·07
18	8·01	7·98	+ 0·03	10	13·50	13·46	+ 0·04
21	8·06	8·04	+ 0·02	11	13·90	13·62	+ 0·28
23*	8·20	8·10	+ 0·10	25	15·87	15·82	+ 0·05
28	8·37	8·34	+ 0·03	26	15·92	15·96	— 0·04
30*	8·43	8·48	— 0·05	June 15	17·73	17·74	— 0·01
Oct. 12	9·80	9·84	— 0·04	16	17·88	17·76	+ 0·12
16	10·23	10·46	— 0·23	21	17·93	17·80	+ 0·13
26*	12·37	12·38	— 0·01	22	18·16	17·78	+ 0·38
28	12·90	12·80	+ 0·10	July 13	16·17	16·14	+ 0·03
29	13·12	13·02	+ 0·10	24	14·58	14·48	+ 0·10
Nov. 2	14·16	13·90	+ 0·26				
16	17·34	17·24	+ 0·10				
20	18·16	18·16	0·00				
Dec. 1*	20·33	20·38	— 0·05				
8	21·60	21·48	+ 0·12				

Sidereal Intervals occupied by the Transit of the Moon's Diameter compared with those of the Nautical Almanac.

1846.				1847.			
Feb. 10	2. 4·11	4·00	+ 0·11	April 29	§2. 6·04	6·04	0·00
March 12	3·94	3·78	+ 0·16	May 29	14·70	13·96	+ 0·74
				Oct. 23	21·51	21·16	+ 0·35
1847.				1848.			
March 31	2·57	2·50	+ 0·07	July 15	14·01	13·70	+ 0·31

* Imperfect. ‡ Noted as bad. § Second Limb at two wires only.

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Sidereal Intervals occupied by the Transit of Mars' Diameter compared with those of the Nautical Almanac.

1847.	Observed Duration of Transit.	Seconds of Nautical Almanac.	O — N.	1847.	Observed Duration of Transit.	Seconds of Nautical Almanac.	O — N.
	s.	s.	s.		s.	s.	s.
Oct. 25	1·51	1·34	+ 0·17	Nov. 12	1·45	1·24	+ 0·21
27	1·67	1·32	+ 0·35	23	1·48	1·12	+ 0·36
28	1·72	1·32	+ 0·40				

Sidereal Intervals occupied by the Transit of Jupiter's Diameter compared with those of the Nautical Almanac.

1846.				1848.			
Dec. 10	3·46	3·48	— 0·02	Feb. 11	3·32	3·26	+ 0·06
30	3·22	3·38	— 0·16	15†	3·56	3·24	+ 0·32
				22	3·38	3·18	+ 0·20
1847.				March 3	2·96	3·06	— 0·10
Jan. 14	3·32	3·26	+ 0·06	7	3·14	3·04	+ 0·10
15	3·36	3·26	+ 0·10	9	2·94	3·02	— 0·08
Feb. 8	2·88	3·04	— 0·16	10	3·00	3·02	— 0·02
10	2·98	3·02	— 0·04	15	2·88	2·96	— 0·08
12	2·90	2·98	— 0·08				

Sidereal Intervals occupied by the Transit of Saturn's Diameter compared with those of the Nautical Almanac.

1846.				1847.			
Sept. 18	1·18	1·26	— 0·08	Sept. 3	1·40	1·26	+ 0·14
25	1·11	1·24	— 0·13	Oct. 8	1·22	1·24	— 0.02
28	1·35	1·24	+ 0·11	11	1·24	1·24	0·00
Oct. 1	1·16	1·24	— 0·08	21	1·20	1·22	— 0.02
2	1·07	1·23	— 0·16	25	1·28	1·20	+ 0·08
3	1·17	1·22	— 0·05	27	1·05	1·20	— 0·15
20	1·28	1·20	+ 0·08	28	1·22	1·20	+ 0·02
27	1·09	1·20	— 0·11				
29	1·13	1·20	— 0·07	1848.			
				Jan. 4	0·93	1·08	— 0·15

Right Ascensions of the Sun's Centre.

	Date of Observation.	Limb Observed.	R.A. from Observation.	Seconds of Nautical Almanac.	O — N.
			h. m. s.	s.	s.
	1846.				
	Jan. 23		20. 21. 57·07	57·43	— 0·36
	Feb. 2		21. 3. 16·24	16·03	+ 0.21
	5		21. 17. 23·09	23·33	— 0·24
	12	II	21. 43. 11·33	11·66	— 0·33
	March 2		22. 52. 2·14	2·75	— 0·61
	10		23. 21. 41·49	41·35	+ 0·14
	14		23. 36. 22·08	21·64	+ 0·44
	25	II	0. 16. 26·03	26·06	— 0·03
	26		0. 21. 4·16	4·13	+ 0·03
	April 14	II	1. 29. 25·41	25·54	— 0·13

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Right Ascensions of the Sun's Centre—*Continued.*

Date of Observation.	Limb Observed.	R.A. from Observation.	Seconds of Nautical Almanac.	O — N.
		h. m. s.	s.	s.
1846.				
May 11	I	3. 11. 42·57	42·52	+ 0·05
15		3. 27. 25·23	24·79	+ 0·44
16		3. 31. 22·09	21·84	+ 0·25
30		4. 27. 38·54	38·61	— 0·07
June 1		4. 35. 48·92	48·72	+ 0·20
2		4. 39. 54·52	54·38	+ 0·14
3		4. 44. 0·27	0·39	— 0·12
4		4. 48. 6·75	6·75	0·00
5		4. 52. 13·70	13·45	+ 0·25
6		4. 56. 20·52	20·48	+ 0·04
12	II	5. 21. 8·82	8·51	+ 0·31
15		5. 33. 35·67	35·51	+ 0·16
17		5. 41. 54·24	54·27	— 0·03
18		5. 46. 3·73	3·81	— 0·08
24		6. 11. 1·60	1·69	— 0·09
29		6. 31. 47·50	47·68	— 0·18
July 25		8. 17. 28·53	28·64	— 0·11
Aug. 3		8. 52. 40·98	41·01	— 0·03
4	I	8. 56. 32·74	32·61	+ 0·13
6		9. 4. 14·67	13·98	+ 0·69
10	I	9. 19. 29·69	29·63	+ 0·06
11		9. 23. 17·20	17·10	+ 0·10
Sept. 15		11. 31. 28·99	28·78	+ 0·21
16		11. 35. 4·41	4·22	+ 0·19
19		11. 45. 50·65	50·56	+ 0·09
Oct. 2		12. 32. 42·21	42·24	— 0·03
3		12. 36. 19·81	20·01	— 0·20
26		14. 2. 0·29	0·23	+ 0·06
27		14. 5. 51·03	51·13	— 0·10
28		14. 9. 42·55	42·76	— 0·21
29		14. 17. 28·24	28·22	+ 0·02
Nov. 7		14. 49. 1·65	1·70	— 0·05
Dec. 2	II	16. 33. 21·79	22·00	— 0·21
3		16. 37. 41·96	42·04	— 0·08
7		17. 55. 7·88	7·98	— 0·10
11		17. 12. 42·27	42·13	+ 0·14
14		17. 25. 57.15	57·07	+ 0·08
29		18. 32. 32·56	32·38	+ 0·18
30		18. 36. 58·30	58·10	+ 0·20
1847.				
Jan. 29		20. 45. 54·06	54·05	+ 0·01
Feb. 3		21. 6. 19·23	19·16	+ 0·07
5	II	21. 14. 23·56	23·49	+ 0·07
6		21. 18. 24·54	24·46	+ 0·08
8		21. 26. 24·30	24·01	+ 0·29
9		21. 30. 22·97	22·62	+ 0·35
10		21. 34. 20·68	20·46	+ 0·22
11		21. 38. 17·87	17·52	+ 0·35

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Right Ascension of the Sun's Centre—*Continued.*

Date of Observation.	Limb Observed.	R.A. from Observation.	Seconds of Nautical Almanac.	O — N.
		h. m. s.	s.	s.
1847.				
Feb. 12		21. 42. 13·90	13·82	+ 0·08
13		21. 46. 9·33	9·37	— 0·04
19		22. 9. 27·39	27·20	+ 0·19
25		22. 32. 20·39	20·11	+ 0·28
March 10		23. 20. 47·11	46·76	— 0·65
13		23. 31. 47·95	48·04	— 0·09
April 5		0. 55. 33·10	32·93	+ 0·17
6		0. 59. 11·88	11·79	+ 0·09
8		1. 6. 30·35	30·16	+ 0·19
9		1. 10. 9·70	9·71	— 0·01
10		1. 13. 49·64	49·53	+ 0·11
17		1. 39. 36·89	36·96	— 0·07
26		2. 13. 13·74	13·71	+ 0·03
29		2. 24. 34·23	34·12	+ 0·11
May 4		2. 43. 38·71	38·68	+ 0·03
14		3. 22. 30·94	31·04	— 0·10
15		3. 26. 27·73	27·51	+ 0·22
26		4. 10. 24·36	24·52	— 0·16
27	II	4. 14. 27·15	27·30	— 0·15
June 24		6. 10. 1·29	1·10	+ 0·19
29		6. 30. 46·69	46·43	+ 0·26
July 5		6. 55. 34·11	34·27	— 0·16
8		7. 7. 54·36	54·32	+ 0·04
12		7. 24. 15·84	15·82	+ 0·02
14		7. 32. 23·89	23·96	— 0·07
15		7. 36. 27·29	27·31	— 0·02
29		8. 32. 15·77	15·83	— 0·06
30		8. 36. 10.71	10·59	+ 0·12
31		8. 40. 4·96	4·77	+ 0·19
Aug. 14		9. 33. 42·25	42.04	+ 0·21
Sept. 2		10. 43. 45·18	45·25	— 0·07
15	II	11. 30. 37·04	37·18	— 0·14
18		11. 41. 23·42	23·34	+ 0·08
21		11 .52. 9·30	9·47	— 0·17
23		11. 59. 20·40	20·52	— 0·12
Oct. 9		12. 57. 20·73	20·87	— 0·14
12		13. 8. 23·67	23·87	— 0·20
26		14. 1. 3·18	3.43	— 0·25
28		14. 8. 45·22	45·43	— 0·21
29		14. 12. 37·37	37·57	— 0·20
Nov. 20		15. 41. 13·36	13·45	— 0·09
Dec. 1		16. 27. 58·62	58·71	— 0·09
11	II	17. 11. 38·45	38·48	— 0·03
1848.				
Jan. 4		18. 57. 58·02	58·17	— 0·15
6		19. 6. 45·85	45·78	+ 0·07
11		19. 28. 36·14	36·19	— 0·05

May 15, bad, cloudy.

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Right Ascensions of the Sun's Centre—*Continued.*

Date of Observation.	Limb Observed.	R.A. from Observation.	Seconds of Nautical Almanac.	O — N.
		h. m. s.	s.	s.
1848.				
Feb. 23		22. 23. 49·78	49·86	— 0·08
28		22. 42. 43·78	43·94	— 0·16
March 9	I	23. 19. 54.56	54·95	— 0·39
14		23. 38. 15·91	15·85	+ 0·06
22		0. 7. 24·97	24·82	+ 0·15
29		0. 32. 50·85	50·81	+ 0·04
30		0. 36. 28·82	28·95	— 0·13
May 3		2. 42. 43·92	43·96	— 0·04
4		2. 46. 34·51	34·54	— 0·03
5		2. 50. 25·64	25·67	— 0·03
6		2. 54. 17·24	17·36	— 0·12
9		3. 5. 55·73	55·77	— 0·04
10		3. 9. 49·86	49·69	+ 0·17
11		3. 13. 44·08	44·14	— 0·06
25		4. 9. 25·26	25·27	— 0·01
26		4. 13. 27·91	28·00	— 0·09
June 15		5. 35. 43·83	43·89	— 0·06
16		5. 39. 53·02	53·15	— 0·13
21		6. 0. 40·39	40·44	— 0·05
22		6. 4. 49·98	49·95	+ 0·03
July 8		7. 11. 0·77	0·83	— 0·06
13		7. 31. 24·16	24·28	— 0·12
24		8. 15. 31·68	31·72	— 0·04

Right Ascensions and North Polar Distances of the Moon's Centre.

Date of Observation.	Limb Observed.	R.A. from Observation.	Seconds of Nautical Almanac.	O — N.	Limb Observed.	N.P.D. from Observation.	Seconds of Nautical Almanac.	O — N.
		h. m. s.	s.	s.		° ′ ″	s.	s.
1846.								
Jan. 1	I	22.12.20·63	20·25	+ 0·38	..	.....	....	....
8	I	4.25.46·12	46·42	— 0·30	..	.....	....	....
9	I	5.18.51·55	51·58	— 0.03	..	.....	....	....
Feb. 4	I	4. 8.41·28	41·63	— 0·35	..	.....	....	....
5	I	5. 1.51·61	52·30	— 0·69	..	.....	....	....
6	I	5.54.29·69	29·71	— 0·02	..	.....	....	....
7	I	6.46.14·42	14·41	+ 0·01	..	.....	....	....
10	I & II	9.14.31·05	31·32	— 0·27	..	.....	....	....
March 4	I	4.42.15·83	16·21	— 0·38	S	70.32.54·0	53·5	+ 0·5
5	I	5.35.43·69	44·18	— 0·49	S	70.18.43·2	37·8	+ 5.4
7	I	7.19. 8 82	9·18	— 0·36	N	72.38.31·4	24·7	+ 6·7
9	I	8.57.31·61	31·71	— 0·10	N	78. 3.62·6	54·0	+ 8·6
11	I	10.32.41·15	40·86	+ 0·29	..	.....	....	....
12	I & II	11.20.11·45	11·01	+ 0·44	..	.....	....	....
May 8	I	13. 8. 7·29	7·79	— 0·50	N	99. 1. 9·3	8·1	+ 1·2
11	II	15.56.34·28	35·03	— 0·75	..	.....	....	....
June 3	I	11.56.15·92	16·57	— 0·65	N	92.57.36·2	33·2	+ 3·0
5	I	13.36.24·80	25·32	— 0·52	N	101. 3.13·1	4·8	+ 8·3
6	I	14.30.46·42	47·09	— 0·67	N	104.32.49·7	40·0	+ 9·7

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Right Ascensions and North Polar Distances of the Moon's Centre—*Continued.*

Date of Observation.	Limb Observed.	R.A. from Observation.	Seconds of Nautical Almanac.	O — N.	Limb Observed.	N.P.D. from Observation.	Seconds of Nautical Almanac.	O — N.
		h. m. s.	s.	s.		° ′ ″	s.	s.
1846.								
July 3	I	14. 5.41·75	42·67	— 0·92	N	102.51.37·1	24·3	+ 12·8
4	I	15. 0.42·19	43·02	— 0·83	N	105.57.54·8	46·1	+ 8·7
7	I	18. 5.48·10	48·92	— 0·82	N	109.13.64·2	54·6	+ 9·6
Aug. 3	I	17.33.31·79	32·94	— 1·15	N	109.21.19·2	10·0	+ 9·2
Sept. 28	I	18 46.33·26	34·24	— 0·98	S	107.59.32·7	26·1	+ 6·6
Oct. 1	I	21.46.58·02	58·85	— 0·83	S	108.27.46·7	35·2	+ 11·5
2	I	22.46. 5·94	6·55	— 0·61	S	93.42.12·3	7·1	+ 5·2
3	I	23.44.49·32	50·34	— 1·02	S	88.40.67·5	58·5	+ 9·0
27	I	20.26.37·28	37·55	— 0·27	S	103.47.58·3	46·7	+ 11·6
29	I	22.22. 0·57	0·96	— 0·39	S	95.40.37·6	29·2	+ 8·4
30	I	23.18.53·71	54·09	— 0·38	S	90.53.42·8	38·6	+ 4·2
Nov. 27	I	23.55.38·03	38·43	— 0·40	S	87.50.14·2	10·9	+ 3·3
Dec. 2	II	4.40.20·66	20·82	— 0·16	..	.....	. ..	....
29	I	4.18.22·35	22·55	— 0·20	S	71.55.13·2	15·1	— 1·9
30	..	.....	....	.....	S	71. 1.42·4	48·9	— 6·5
1847.								
Jan. 28	I	6.47. 6·83	6·86	— 0·03	S	71.55.54·5	58·0	— 3·5
29	I	7.39.58·30	58·17	+ 0·13	S	73.37.10·1	2·0	+ 8·1
Feb. 22	I	4.39.50·72	52·05	— 1·33	S	71.52. 9·0	10·0	— 1·0
24	I	6.30.26·15	26·61	— 0·46	S	71.45.43·8	39·1	+ 4·7
25	I	7.23.26·14	26·20	— 0·06	N	73. 7.46·9	43·9	+ 3·0
Mar. 29	I	11.10. 6·88	7·25	— 0·37	N	87.37.12·2	9·1	+ 3·1
31	I & II	12.43.10·90	11·08	— 0·18	..	.....	....	....
April 27	I	12.26.35·24	36·23	— 0·99	N	93.59.12·1	7·6	+ 4·5
28	I	13.14. 3·83	4·38	— 0·55	N	97.43.38·0	31·1	+ 6·9
29	I	14. 3. 0·96	1·33	— 0·37	N	101.10.50·2	43·8	+ 6·4
30	I & II	14.53.51·66	51·93	— 0·27	..	.....	....	....
May 25	I	12.55.40·83	41·80	— 0·97	N	96.13.54·5	52·7	+ 1·8
26	I	13.43·56·38	57·07	— 0·69	N	99.50. 7·6	6·2	+ 1·4
27	I	14.34. 7·14	7·71	— 0·57	N	103.14.45·2	38·7	+ 6·5
28	I	16.26.36·56	37·07	— 0·51	N	105.43.18·8	14·9	+ 3·9
29	I & II	16.21.29·62	29·88	— 0·26	..	.....	....	....
June 21	I	12.36.46·26	47·09	— 0·83	N	94.30.31·1	26·0	+ 5·1
23	I	14.13. 0·60	1·22	— 0·62	N	101.37. 9·9	3·7	+ 6·2
25	I	15.57.56·87	57·58	— 0·71	N	106.50.33·5	25·8	+ 7·7
July 23	I	16.28.25·85	26·85	— 1·00	..	.....	....	....
Sept. 22	..	.....	....	.....	S	96.39.49·2	42·8	+ 6·4
Oct. 21	I	23.53.36·76	37·19	— 0·43	S	89.35. 9·3	7·4	+ 1·9
23	I & II	1.54.48·25	48·74	— 0·49	..	.....	....	....
Nov. 13	I	19.43.30·00	30·59	— 0·59	S	106.16.54·4	45·2	+ 9·2
19	I	1.23.31·29	31·58	— 0·29	S	82.28.59·3	56·1	+ 3·2
22	II	4.29.21·69	22·08	— 0·39	..	.....	....	....
Dec. 20	I	5. 0.55·63	55·91	— 0·28	S	71.58.23·3	18·3	+ 5·0
1848.								
Jan. 11	I	23.48.38·70	39·64	— 0·94	S	90.37.44·4	41·5	+ 2·9
Feb. 11	I	3.19.16·42	17·09	— 0·67	S	75.46.24·1	22·9	+ 1·2
15	I	†7.14.15·33	15·85	— 0·52	..	.....	....	....

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Right Ascensions and North Polar Distances of the Moon's Centre—*Continued.*

Date of Observation.	Limb Observed.	R.A. from Observation.	Seconds of Nautical Almanac.	O — N.	Limb Observed.	N.P.D. from Observation.	Seconds of Nautical Almanac.	O — N.
		h. m. s.	s.	s.		° ″ ′	s.	s.
1848.								
Feb. 16	I	8.10.11·32	11·80	— 0·48	N	74.30. 5·4	0·6	+ 4·8
17	I	†9. 2.60·02	59·66	+ 0·36	..	.....	....	....
Mar. 11	I	4.59.22·34	23·14	— 0·80	S	72.24.52·1	47·2	+ 4·9
15	I	†8.46.44·76	45·15	— 0·39	N	76.16.12·3	7·9	+ 4·4
April 11	I	8.30.17·34	17·89	— 0·55	N	75.25.47·3	42·9	+ 4·4
13	I	10.12.45·38	46·03	— 0·65	N	81.36.36·1	32·5	+ 3·6
14	I	11. 1. 5·70	6·59	— 0·89	N	85.16.18·9	13·8	+ 5·1
May 13	I	12.20. 0·58	1·58	— 1·00	N	91.35.50·9	50·4	+ 0·5
July 13	I	17.28.39·59	40·16	— 0·57	N	108.11.27·3	29·2	— 1·9
15	I & II	19.18.31·40	31·91	— 0·51	..	.....	....	....

Right Ascensions and North Polar Distances of the Centre of Venus.

1846.								
Jan. 1	I	22. 0.35·83	35·55	+ 0·28	..	.....	....	....
23	I	22.59.55·20	54·93	+ 0·27	..	.....	.. .	....
June 14	II	2.36.57·55	57·85	— 0·30	..	.....	....	....
July 21	II	5.30.26·78	27·05	— 0·27	N	68.11.52·3	44.4	+ 7·9
24	II	5.45.34·82	35·31	— 0·49	N	67.55.26·3	20.2	+ 6·1
Aug. 5	II	6.46.55·31	55·33	— 0·02	S	67.43.38·5	36.1	+ 2·4
Oct. 2	II	11.31. 2·55	2·66	— 0·11	C	85.18.21·8	16.4	+ 5·4
26	I	13.21.21.84	21·60	+ 0·24	C	97. 4.38·0	39.0	— 1·0
27	I	13.26. 1·61	1·51	+ 0·10	C	97.33.28·0	28.2	— 0·2
1847.								
Feb. 3	I	21.54.53·68	53·48	+ 0·20	S	104.16.19·8	13·8	+ 6·0
8	II	22.18.58·99	58·81	+ 0·18	S	102. 4.59·0	52·9	+ 6·1
Mar. 16	I	1. 3.44·89	45·33	— 0·44	N	84. 0.15·3	13·6	+ 1·7
April 8	II	2.50.33·98	31·28	— 0·30	S	73.20. 9·5	5·3	+ 4·2
9	I	2.55.22·47	23·02	— 0·55	S	72.56.11·5	9·4	+ 2·1
June 22	I	9. 5. 9·96	9·93	+ 0·03	N	71.17.24·4	34·3	— 9·9
July 3	I	9.52. 2·09	1·90	+ 0·19	N	75.29.19·9	28·9	— 9·0
15	I	10.38.47·98	47·65	+ 0·33	N	80.42.23·3	31·1	— 7·8
31	I	11.33.51·35	50·67	+ 0·68	N	88. 6.31·5	40·9	— 9·4
Aug. 3	I	11.43. 9·40	8·91	+ 0·49	N	89.29.43·4	48·4	— 5·0
14	I	12.13.59·78	59·16	+ 0·62	N	94.24.32·9	32·9	0·0
19	I	12.25.57·01	56·75	+ 0·26	N	96.29.36·4	35·2	+ 1·2
Oct. 27	II	12. 2.43·04	42·51	+ 0·53	S	93·38.32·4	10·9	+ 21·5*
1848.								
Mar. 13	..	.....	....	.....	N	105. 8.57·8	57·2	+ ·06
14	I	21.37.24·77	24·71	+ 0·06	N	104.48. 6·7	14·2	— 7·5
21	II	22.10.47·26	47·11	+ 0·15	N	102·12. 7·2	12·4	— 5·2

* There does not appear to be any mistake in the Reductions.

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Right Ascensions and North Polar Distances of the Centre of Mars.

Date of Observation.	Limb Observed.	R.A. from Observation.	Seconds of Nautical Almanac.	O — N.	Limb Observed.	N.P.D from Observation.	Seconds of Nautical Almanac.	O — N.
		h. m. s.	s.	s.		° ″ ′	s.	s.
1847.								
Oct. 19	II	2.37.23·42	20·74	+ 2·70	S	76.28.56·3	51·5	+ 4·8
21	II	2.34.44·08	41·77	+ 2·31	S	76.34.41·2	34·4	+ 6·8
25	I & II	2.29.11·88	9·24	+ 2·64	S	76.46.66·3	59·1	+ 7·2
27	I & II	2.26.21·14	18·70	+ 2·44	S	76.53.40·0	31·1	+ 8·9
28	I & II	2.24.55·40	53·03	+ 2·37	S	76.56.60·8	49·6	+ 11·2
Nov. 6	I	2.12.28·09	25·73	+ 2·36	S	77.25.50·2	41·4	+ 8·8
12	I & II	2. 5.18·55	16·20	+ 2·35	S	77.40.65·6	57·9	+ 7·7
23	I & II	1.56.22·11	20·06	+ 2·05	S	77.52.33·3	27·1	+ 6·2
30	I	1.53.56·61	54·84	+ 1·79	S	77.46.20 4	9·8	+ 10·6
Dec. 3	I	1.53.41·83	39·99	+ 1·84	S	77.40.13·5	6·7	+ 6·8
1848.								
Jan. 11	I	2.25.54·61	53·54	+ 1·07	S	73.58.61·9	53·2	+ 8·7
Feb. 11	I	3.21.33·06	32·15	+ 0·91	S	69.48.24·7	15·4	+ 9·3
28	I	3.58.26·82	26·05	+ 0·77	C	67.46.11·1	6·2	+ 4·9

Right Ascension and North Polar Distance of Flora.

1847. Nov. 19	..	4.49.46·37	..	.....	..	76.11.53·9	....	Not corrected for Parallax.

Right Ascensions and North Polar Distance of Pallas.

1848. March 7	..	10.40. 7·95	6 61	+ 1·34	..	92.11.20·0	122·8	Minute probably erroneous.
15	..	10.35.19·65	18·23	+ 1·42	..	.....	....	

Right Ascensions and North Polar Distances of Ceres.

1848. Mar. 15	..	11.55.10·97	17·12	— 6·15	..	70.43. 2 7	46·2	— 43·5
21	..	50. 1.11	7·27	— 6·16	..	70.18. 3·4	41·5	— 38·1

Right Ascensions and North Polar Distances of the Centre of Jupiter.

1846. Dec. 10		4.36.37·77	37·67	+ 0·10	S	68.39.51·7	47·3	+ 4·4
30		4.26.27·92	27·94	— 0·02	S	68·57.36·8	34·8	+ 2·0
1847.								
Jan. 14		4.21.26·46	26 28	+ 0·18	S	69. 5.48 1	48·7	— 0·6
15		4.21.12·36	12·30	+ 0·06	S	69. 6.10·7	8·0	+ 2·7
Feb. 8		4.19.51·78	51·49	+ 0·29	S	69. 3 51·5	50·8	+ 0·7
10		4.20. 7·03	6·83	+ 0·20	N	69. 2.47·0	47·5	— 0·5
12		4.20·25·63	25·49	+ 0·14	N	69. 1.36·3	36·4	— 0·1
1848.								
Feb. 11		6.49.40·88	40·67	+ 0·21	S	66.46.32·3	28·6	+ 3·7
15	†	6.48.29·40	29·40	0·00	..	.....	....	....
22		6.46.55·30	55·25	+ 0·05	S	66.42.16·8	19·7	— 2·9

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Right Ascensions and North Polar Distances of the Centre of Jupiter.—*Concluded.*

Date of Observation.	Limb Observed.	R.A. from Observation.	Seconds of Nautical Almanac.	O — N.	Limb Observed.	N.P.D. from Observation.	Seconds of Nautical Almanac.	O — N.
		h. m. s.	s.	s.		° ′ ″	″	″
1848.								
March 4		6.45.49·80	49·65	+ 0·15	S	66.40.16·6	17·3	— 0·7
7		6.45.49·83	49·65	+ 0·18	N	66.40. 3·3	4·7	— 1·4
9		6.45.53·99	53·90	+ 0·09	S	66.40. 3·3	1·3	+ 2·0
10		6.45.57·50	57·31	+ 0·19	S	66·40. 5·7	1·0	+ 4·7
15		6.46.27·08	26·83	+ 0·25	S	66.40.17·1	14·4	+ 2·7

Right Ascensions and North Polar Distances of the Centre of Saturn.

1846								
Sept. 18		21.52.60·15	58·75	+ 1·40	S	104.34.28·4	34·9	— 6·5
21	II	21.52.19·36	18·14	+ 1·22	S	104.37.51·1	62·9	— 11·8
25	*	21.51.28·66	27·71	+ 0·95	N	104.42. 6·9	16·4	— 9·5
28		21.51.54·15	52·88	+ 1·27	S	104.45. 3·1	9·3	— 6·2
Oct. 1		21.50.22·11	20·79	+ 1·32	S	104.47.38·5	46·3	— 7·8
2		21.50.11·86	10·73	+ 1·13	S	104.48.28·8	35 0	— 6·2
3		21.50. 2·34	0·99	+ 1·35	N	104.49.14·5	21·9	— 7·4
20		21.48.10·43	9·31	+ 1·12	S	104.57.32·0	40·5	— 8·5
27		21.47.56·54	55·30	+ 1·24	N	104.58.15·4	13·6	+ 1·8
29		21.47.56·18	54·89	+ 1·29	C	104.57.54·3	64·1	— 9·8
1847.								
Sept. 3		22.47. 7·52	5·77	+ 1·75	N	99.55.50·5	61·2	— 10·7
Oct. 8		22.38.13·72	12·09	+ 1.63	N	100.48.26·5	36·3	— 9·8
11	*	22.37.39·11	38·14	+ 0·97	..	.....	....	....
21		22.36. 7·06	5·56	+ 1·50	S	100.59.37·5	40·5	— 3·0
25		22.35.39·59	38·10	+ 1·49	..	.....	....	....
27		22.35.27·94	26·54	+ 1·40	S	101. 2.40·5	43·1	— 2·6
28		22.35.22·79	21·31	+ 1·48	S	101. 3. 1·0	5·6	— 4·6
1848.								
Jan. 4		22.44.15·44	14·18	+ 1·26	S	100. 0.13·4	19·3	— 5·9

* Approximate, cloudy.

Right Ascensions and North Polar Distances of Uranus.

1847.								
Oct. 8		1. 1. 5·54	14·78	— 9·72		84.12.64·6	16·9	+ 47·7
25		0.58.34·69	43·80	— 9·11		84.27.86·4	44·5	+ 41·9
27		0.58.17·50	26·81	— 9·31		84.29.75·3	28·2	+ 47·1
28		0.58. 8·99	18·41	— 9·42		84.30.67·7	19·4	+ 48·3

Right Ascensions and North Polar Distances of Neptune.

1846.								
Oct. 3		21.52.32·22	....	.....		.....	....	....
10		21.52. 6·48	....	.....		.....	....	....
20		21.51.38·43	....	.....		.....	....	....
26		21.51.27·39	....	.....		.....	....	....

1846.—Observations in dark field with illuminated wires.

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Right Ascensions and North Polar Distances of Neptune— *Concluded.*

Date of Observation.	R.A. from Observation.	Tabular Seconds.	Obs.-Ephem.	N.P.D. from Observation.	Tabular Seconds.	Obs.-Ephem.
	h. m. s.	s.	s.	° ′ ″	″	″
1847.						
July 22	22.8.19·78	20·11	—0·33	102. 6.50·6	44·9	+5·7
Aug. 7	22.6.49·18	50·30	—(1·12)	102.15.13·5	17·5	—4·0
13	22.6.13·47	13·77	—0·30	102.18.46·7	43·8	+2·9
19	22.5.36·18	36·47	—0·29	102.22.12·0	12·5	—0·5
Sept. 2	22.4. 8·69	9·24	—0·55	.....	....	....
3	22.4. 2·70	3·12	—0·42	102.30.58·4	50·6	+7·8
4	22.3.56·60	57·03	—0·43	102.31.28·4	24·0	+4·4
16	22.2.46·40	46·97	—0·57	102.37.53·8	47·4	+6·4
20	22.2.24·74	25·27	—0·53	102.39.47·6	45·2	+2·4
Oct. 8	22.1. 2·11	2·63	—0·52	102.47. 7·4	8·9	—1·5
18	22.0.29·01	30·05	—(1·04)	102.50.30·1	27·5	+2·6
27	22.0. 9·66	10·44	—0·78	102.51.42·0	41·3	+0·7

1847.—Aug. 7. Approximate, seen at one wire only.
Sept. 2. Just visible.
Oct. 18. Bad, cloudy.

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OBSERVATORY, DURHAM.

TRANSITS

OF

THE MOON'S DIAMETER,

OBSERVED WITH THE EQUATOREAL.

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Day of Observation.	No. of Wires.	Duration of Transit. Single Observations.
		m. s.
1846.—Feb. 11	2	2. 3·35
	2	3·30
	2	3·25
	2	3·15
	2	3·25
	2	3·25
	2	3·40
	2	3·40
1846.—March 12	2	2. 4·10
	2	3·75
	1	3·80
1846.—Oct. 4	2	2. 18·00
	2	17·90
	2	18·00
	1	18·20
	2	17·85
	2	17·80
	2	18·35
	1	18·30
	1	17·90
	1	18·00
	1	18·10
	1	18·00
	2	17·85
1846.—Dec. 2	2	2. 17·30
	2	17·30
	2	17·30
	2	16·80
	2	17·15
	2	17·15
	2	17·35
	1	17·40
1847.—Feb. 18	2	2. 18·40
	2	18·00
	2	19·05
	2	18·00
	2	18·05

Day of Observation.	No. of Wires.	Duration of Transit. Single Observations.
		m. s.
1847.—March 19	3	2. 18·93
	2	18·50
1847.—April 29	3	2. 6·17
	2	6·20
	3	5·97
	3	6·20
	3	6·10
	3	5·83
	3	6·33
1847.—May 19	2	2. 9·75
	2	9·85
	2	10·05
	2	9·55
	2	10·05
1847.—May 29	3	2. 14·60
	2	14·40
	3	14·53
	3	14·43
	2	14·45
	2	14·35
	2	14·50
1847.—Oct. 23	2	2. 21·25
	2	21·30
	2	21·35
	2	21·30
	2	21·15
	2	21·20
	2	21·10
	1	21·20
	2	21·40
	2	21·15
	2	21·35

1846.—March 12. Interrupted by clouds.
Oct. 4. Seen through clouds. Wind very troublesome.
1847.—Feb. 18. Unilluminated Limb not well seen. Wind troublesome.
March 19. Unilluminated Limb not well seen.
May 19. Unilluminated Limb just visible.

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TRANSITS OF THE MOON'S DIAMETER.

The following are the results of the Observations.

Day of Observation.	Approximate Sidereal Time.	Observed Mean Duration of Transit.	Duration corrected for Defect of Illumination.	Duration by Nautical Almanac.	O — N.
	h. m.	m. s.	m. s.	m. s.	s.
1846.					
Feb. 11	4. 20	2. 3·29	2. 3·35	2. 3·24	+ 0·11
Mar. 12	7. 5	2. 3·90	2. 4·11	2. 3·64	+ 0·47
Oct. 4	0. 53	2. 18·00	2. 18·00	2. 17·50	+ 0·50
Dec. 2	1. 10	2. 17·21	2. 17·22	2. 16·74	+ 0·48
1847.					
Feb. 18	5. 30	2. 18·30	2. 18·30	2. 17·34	+ 0·96
Mar. 19	8. 0	2. 18·76	2. 18·76	2. 19·14	— 0·38
April 29	13. 29	2. 6·11	2. 6·46	2. 6·00	+ 0·46
May 19	13. 28	2. 9·85	2. 9·85	2. 9·44	+ 0·41
May 29	15. 31	2. 14·48	2. 14·49	2. 13·88	+ 0·61
Oct. 23	0. 22	2. 21.25	2. 21·25	2. 21·08	+ 0·17

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OBSERVATORY, DURHAM.

ECLIPSES OF JUPITER'S SATELLITES,

AND

OCCULTATIONS OF STARS

BY

THE MOON.

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Eclipses of Jupiter's Satellites.

Day of Observation.	Satellite.	Phenomenon.	Observed Sidereal Time.
			h. m. s.
1846.—Feb. 7	II	Em.†	5.28.30·2
Feb. 7	III	*(a)* Im. †	6.16.13·2
Mar. 9	I	*(b)* Egr.	7. 9.56·5
Oct. 1	I	Im.	0. 1.45·3
30	III	*(c)* Im.	3.58.47·9
Nov. 2	I	*(d* Im.	22.37.41·1
Dec. 5	III	Em.	4.36.16·1
1847.—Jan. 14	II	Em.	9.16.15·5
Feb. 8	II	Em.	8. 0.31·2
11	I	Em.	4.43.35·3
18	I	Em.	7. 7. 9·7
April 5	I	Em.	10.42.11·6
1848.—Feb. 23	I	Em.	5. 4.54·6
Mar. 24	I	Em.	9.13.25·7

1846.—*(a)* Disappeared very gradually.
(b) Last contact.
(c) Seen by looking *near* it.
(d) Thought to be fading; cloudy at total Immersion.

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Occultations of Stars by the Moon.

Day of Observation.	Star.	Phenomenon.	Moon's Limb.	Observed S.T.
				h. m. s.
1846.—Feb. 1	Mars †	*(a)* disap.	dark	6. 29. 12·9
Mar. 9	κ Cancri	disap.	dark	9. 37. 3·2
April 3	λ Geminorum	disap.	dark	12. 25. 36·3
8	p^4 Leonis	*(b)* disap.	dark	13. 29. 31·7
May 11	β^1 Scorpii	disap.	bright	15. 31. 14·2
July 2	Spica	disap.	dark	14. 41. 38·9
2	Spica	*(c)* reap.	bright	15. 57. 3·4
Nov. 4	A.S.C. 454	*(d)* reap.	dark	23. 37. 7·0
Dec. 4	22 Geminorum	*(e)* disap.	bright	5. 39. 27·7
7	κ Cancri	*(f)* disap.	bright	2. 45. 0·0
1847.—Feb. 24	22 Geminorum	*(g)* disap.	dark	7. 55. 40·9
June 1	ρ^1 Sagittarii	disap.	bright	17. 5. 41·7
Aug. 24	z^2 Aquarii	*(h)* disap.	dark	18. 15. 41·6
Sept. 28	75 Tauri	*(i)* disap.	bright	22. 54. 51·1
1848.—Feb. 12	75 Tauri	*(k)* disap.	dark	4. 29. 15·3
12	75 Tauri	*(l)* reap.	bright	5. 39. 20·0
12	Aldebaran	*(m)* reap.	bright	9. 26. 9·2
Mar. 7	.....	*(n)* disap.	dark	6. 7. 47·3

1846.—*(a)* Complete; light about 2^s. fading.

(b) Believed to be correct, but possibly 28^m., as I continued to watch, on account of clouds.

(c) Possibly 2^s. too late.

(d) Extremely faint, in haze; possibly some seconds too late.

(e) Near; star very faint near the limb, and precise instant lost.

(f) Probably too early; star faint and Moon's edge waving.

1847.—*(g)* Uncertain to about 4^s. on account of clouds.

(h) Uncertain, clouds.

(i) Faint, not exact.

1848.—*(k)* Near; clock not heard on account of wind.

(l) Not seen till some seconds from the limb.

(m) Not very exact; wind.

(n) A small star; disappeared about 125°. from N. point.

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RIGHT ASCENSIONS AND NORTH POLAR DISTANCES

OF THE

PLANETS, NEPTUNE AND FLORA,

OBSERVED WITH THE EQUATOREAL.

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Right Ascensions and North Polar Distances of NEPTUNE.

Day.	Greenwich Mean Time.	R.A.	N.P.D.	No. of Observations.	Star of Comparison.
	h. m. s.	h. m. s.	° ′ ″		
1846.					
Oct. 29	6. 35. 0	.....	103.34. 1·5	2	B. A. C. 7648.
29	6. 51. 0	21.51.23·74	.....	6	— —
30	6. 1. 0	21.51.23·00	103.34. 4·2	3	— —
Nov. 7	7. 26. 0	21.51.19·51	103.34.16·8	6	— —
9 *	8. 15. 0	.....	103.34.15·6	2	— —
10	6. 3. 0	.....	103.34.10·2	3	— —
10	6. 49. 0	21.51.19·14	.....	11	— —
19 *	6. 57. 0	.....	103.33.17·0	2	— —
19	7. 50. 0	21.51.31·38	.....	3	— —
21 *	5. 58. 0	.....	103.32.59·9	1	— —
24	7. 50. 0	21.51.39·95	.. ...	8	— —
24	8. 18. 0	.....	103.32.20·6	4	— —
27	8. 1. 0	.....	103.31.42·9	2	— —
27 *	9. 6. 0	21.51.48·13	.....	2	— —
30	7. 4. 0	21.51.56·44	103.30.56·2	6	— —
Dec. 1	6. 10. 0	.....	103.30.34·2	5	— —
1	6. 40. 0	21.51.59·70	.....	10	— —
2	6. 41. 0	.....	103.30.15.8	4	— —
2	7. 11. 0	21.52. 3·08	.....	10	— —
4	7. 34. 0	.....	103.29.38·5	2	— —
4	8. 4. 0	21.52.10·20	.....	8	— —
5 ‡	8. 29. 0	.....	103.29.12·4	2	— —
5 ‡	8. 49. 0	21.52.14·17	.....	3	— —
10	6. 33. 0	.....	103.27.30·0	7	— —
10	7. 6. 0	21.52.34·01	.....	8	— —
14	6. 38. 0	.....	103.25.51·7	10	— —
14	6. 54. 19	21.52.52·78	.....	1	— —
22	4. 55. 40	.....	103.22.10·6	6	— —
22	5. 36. 18	21.53.34·46	.....	8	B. A. C. 7648.
1847.					
Aug. 7	11. 26. 57	22. 6.50·37	102.15.16·9	1	38 Aquarii.
9	12. 15. 33	22. 6.38·12	102.16.24·4	5	— —
13	11. 23. 40	22. 6.13·74	102.18.45·2	7	— —
14	10. 18. 42	22. 6. 7·85	102.19.14·3	7	— —
19	13. 19. 45	22. 5.35·68	102.22.14·4	4	— —
23	14. 16. 32	22. 5.10·36	102.24.38·4	7	— —
24 §	9. 23. 18	22. 5. 5·33	102.25. 5·6	3	— —
31 §	10. 25. 10	22. 4.21·35	102.29.15·4	7	— —
Sept. 1	11. 37. 3	22. 4.14·75	102.29.46·0	6	38 and 40 Aquarii.
2 §	12. 1. 17	22. 4. 8·54	102.30.21·5	2	38 Aquarii.
3	11. 37. 2	22. 4. 2·63	102.30.52·7	11	38 and 40 Aquarii.
4	11. 47. 59	22. 3.56·51	102.31.27·0	9	——— —
10	13. 14. 34	22. 3.19·83	102.34.44·2	5	40 Aquarii.
13	11. 50. 33	22. 3. 3·20	102.36.19·7	7	— —

* Mere approximations; wind.
‡ Very faint.
§ Not good; planet faint.

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Right Ascensions and North Polar Distances of NEPTUNE.—*Concluded.*

Day.	Greenwich Mean Time.	R.A.	N.P.D.	No. of Observations.	Star of Comparison.
	h. m. s.	h. m. s.	° ′ ″		
1847.					
Sept. 14	8. 52. 28	22. 2.58·08	102.36.45·3	8	40 Aquarii.
20	10. 55. 24	22. 2.24·57	102.39.48·1	7	— —
28	8. 35. 49	22. 1.44·99	102.43.22·9	6	— —
Oct. 21	9. 31. 49	.....	102.50.43·1	4	— —
27	8. 41. 37	22. 0. 9·54	102.51.46·7	6	— —
28 *	7. 54. 2	22. 0. 8·29	102.51.53·4	6	— —
Nov. 2 *	5. 38. 44	22. 0. 1·61	102.52.25·0	2	— —
9	7. 34. 12	21.59.58·94	102.52.36·7	8	— —
17	9. 23. 6	22. 0. 3·46	102.52. 8·1	5	— —
19	9. 18. 34	22. 0. 6·12	102.51.52·7	2	— —
1848.					
Jan. 11	5. 46. 11	22. 4. 7·02	102.29.45·2	3	38 Aquarii.

* Cloudy.

Right Ascensions and North Polar Distances of FLORA.

1847.					
Oct. 27	10. 37. 35	5. 3.52·84—·035 P	.....	5	(*a*) see Introduction.
28	10. 39. 26	5. 3.42·48—·034	.....	5	
Nov. 1	10. 1. 44	5. 2.33·65—·036	76. 9.18·6—·74P	2	BZ. iv. 1312.
2	11. 40. 59	5. 2. 8·74—·025	76.10. 7·4—·68	5	— —
9 *	9. 58. 47	4.58.19·58—·033	76.13.21·1—·72	8	— —
16	11. 16. 15	4.52.41·24—·019	76.13.18·1—·67	4	B.A.C. 1500.
19	12. 11. 0	4.49.48·67—·009	76.11.55·7—·65	7	— —
Dec. 3	12. 5. 2	4.34.41·36+·002	.....	6	— —
3 *	12. 34. 3	.....	75.53.27·5·—65	2	— —
11	10. 33. 48	4.26. 7·72—·007	75.34.14·8—·64	8	— 1409.
1848.					
Jan. 5	10. 23. 49	4.10. 0·45+·010	73.49.42·6—·63	7	— 1329.
11	8. 21. 5	4. 9.34·12—·006	73.17.15·3—·60	2	— 1350.
13	10. 21. 18	.....	73. 5.31·2—·62	7	— 1356.
13	10. 37. 48	4. 9.44·47+·019	.....	7	— 1346.
13	10. 37. 48	4. 9.44·55+·019	.....	7	— 1356.
26	8. 26. 20	.....	71.47.45·1—·58	8	H.C. 8125.
26	8. 32. 14	4.14.24·54+·006	.....	9	— —
28	7. 48. 57	4.15.36·87—·001	71.35.32·8—·59	7	B.A.C. 1361.
28	10. 57. 10	4.15,41·80+·029	71.34.45·1—·64	1	— —
31	6. 51. 52	4.17.40·48—·009	71.17. 5·8—·59	8	— —
31	9. 26. 14	4.17·45·29+·017	71.16.27·0—·60	1	— —
31	10. 27. 49	4.17.46·99+·026	71.16.11·5—·63	4	— —
Feb. 1	9. 57. 16	4.18.31·41+·023	71.10.10·1—·62	10	ε Tauri.
2 ‡	9. 32. 41	4.19.18·15+·020	71. 4. 7·4—·60	10	—
10	10. 28. 30	4.26.42·94+·031	70.14.15·5—·64	14	B.A.C. 1417.
11	7. 58. 26	.....	70. 8.53·9—·57	8	— —
11	8. 5. 46	4.27.39·19+·009	.....	8	— —
19	8. 39. 12	4.36.52·53+·019	69.20.45·9—·58	5	H.C. 8844.
March 7	9. 16. 58	5. 0.54·91+·031 P	67.49.15·5·—61P	2	B.A.C. 1620.

* N.P.D. doubtful.
‡ Faint; observation difficult.

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OBSERVATORY, DURHAM.

MEASURES OF DISTANCES AND ANGLES OF POSITION

OF

DOUBLE STARS,

AND OF

DIAMETERS OF PLANETS,

OBSERVED WITH THE EQUATOREAL AND DOUBLE-IMAGE MICROMETER.

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